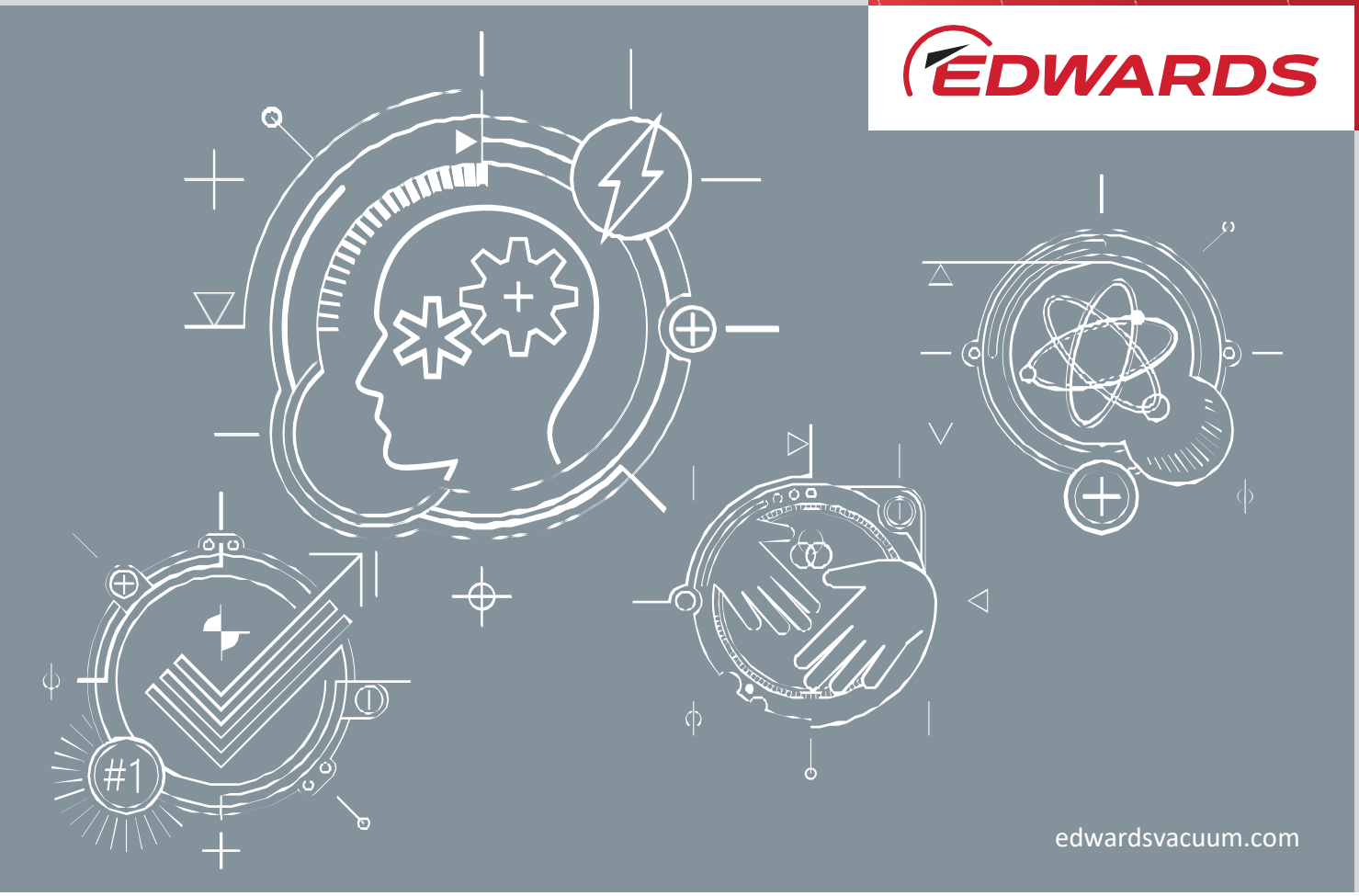

EtherCAT®
Barocel 7025, 7045, 7100

FOR CAPACITANCE DIAPHRAGM GAUGES

INSTRUCTION MANUAL

Official Distributor in Australia

EZZI VISION

Vacuum and Thin Film Technology

CONTACT US
T: 1800 GO EZZI
E: sales@ezzivision.com.au
W: ezzivision.com.au

VIC: 13/62 Ramset Drive, Chirnside Park, VIC 3116, Australia
NSW: Unit 1, 80 O'Riordan St, Alexandria, NSW 2015, Australia
WA: Unit 11, 24 Baile Road, Canning Vale, WA 6155 Australia

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Product warranty and limit of liability are dealt with in our standard terms and conditions of sale or negotiated contract under which this document is supplied.

You must use this product as described in this manual. Read the manual before you install, operate, or maintain the product.

Numbering matrix

Part numbers of standard products are indicated below.

Product	Part number
Barocel 7025 1000 torr 16KF ECAT	W602111155
Barocel 7025 100 torr 16KF ECAT	W602112155
Barocel 7025 10 torr 16KF ECAT	W602113155
Barocel 7025 1 torr 16KF ECAT	W602114155
Barocel 7025 0.1 torr 16KF ECAT	W602115155
Barocel 7025 1000 torr 8VCR ECAT	W602111255
Barocel 7025 100 torr 8VCR ECAT	W602112255
Barocel 7025 10 torr 8VCR ECAT	W602113255
Barocel 7025 1 torr 8VCR ECAT	W602114255
Barocel 7025 0.1 torr 8VCR ECAT	W602115255
Barocel 7025 1000 torr DN16CF ECAT	W602111355
Barocel 7025 100 torr DN16CF ECAT	W602112355
Barocel 7025 10 torr DN16CF ECAT	W602113355
Barocel 7025 1 torr DN16CF ECAT	W602114355

Product	Part number
Barocel 7025 0.1 torr DN16CF ECAT	W602115355

The part number can be taken from the product nameplate.

If not indicated otherwise in the legends, the illustrations in this document correspond to Barocel 7045 gauges with the DN 16 ISO KF vacuum connection. They apply to other vacuum connections and the other gauges by analogy.

In all communications with us, specify the information on the product nameplate.

Contents

List of Figures

1. Safety and compliance

1.1 Definition of Warnings and Cautions

NOTICE:

For safe operation from the start, read these instructions carefully before you install or commission the equipment and keep them safe for future use.

Read all the safety instructions in this section and the rest of this manual carefully and make sure that you obey these instructions. The equipment must only be operated and maintained by trained personnel in the proper condition and as described in this instruction manual.

Obey local and state requirements and regulations. If you have any questions about safety, operation or maintenance of the device, please contact our nearest subsidiary.

Important safety information is highlighted as warning and caution instructions. Obey these instructions.

WARNING:

If you do not obey a warning, there is a risk of injury or death. Different symbols are used according to the type of hazard.

CAUTION:

If you do not obey a caution, there is a risk of minor injury, damage to equipment, related equipment or process.

NOTICE:

Information about properties or instructions for an action which, if ignored, will cause damage to the pump or the system.

We reserve the right to change the design and the stated data. The illustrations are not binding.

Keep the instructions for future use.

1.2 Trained personnel

"Trained personnel" for the operation of this equipment are

- skilled workers with knowledge in the fields of mechanics, electrical engineering, pollution abatement and vacuum technology and
- personnel specially trained for the operation of vacuum pumps.

1.3 Safety symbols

The safety symbols on the products show the areas where care and attention is necessary.

The safety symbols that follow are used on the product or in the product documentation.

	Warning/Caution An appropriate safety instruction must be followed or caution to a potential hazard exists.

2. Important safety information

2.1 General information

CAUTION: DATA TRANSMISSION ERRORS

Risk of transmission errors. Any attempt to simultaneously operate the gauge with the RS232C serial interface and EtherCAT may result in incorrect data and data transmission errors.
So do not simultaneously operate the gauge with the RS232C serial interface and EtherCAT interface.

3. Description

3.1 Intended use

This communication protocol contains instructions for operating EtherCAT secondary interfaces together with a primary interface.

Note:

For safety information, specifications and operation instructions of the vacuum gauges refer to the respective manual.

3.2 EtherCAT interface

The following description of the EtherCAT interface is compliant with the EtherCAT specification of the EtherCAT Technology Group (ETG) and the EtherCAT Semiconductor Device Profile.

This manual describes the functionality of an EtherCAT secondary interface and supports:

- ETG.5003.1 S (R) V1.1.0: Part 1 Common Device Profile (CDP) and
- ETG.5003.2080 S (R) V1.3.0: Part 2080: Specific Device Profile (SDP) Vacuum Pressure Gauge.

For operating the gauge with EtherCAT, prior installation of the device specific ESI file is required on the bus master side. This file can be downloaded from our website.

3.3 Validity

This document applies to products of the Barocel 7025, Barocel 7045 and Barocel 7100 series with EtherCAT interface. This manual is based on firmware version 1.3.0.0.

4. Interface connection

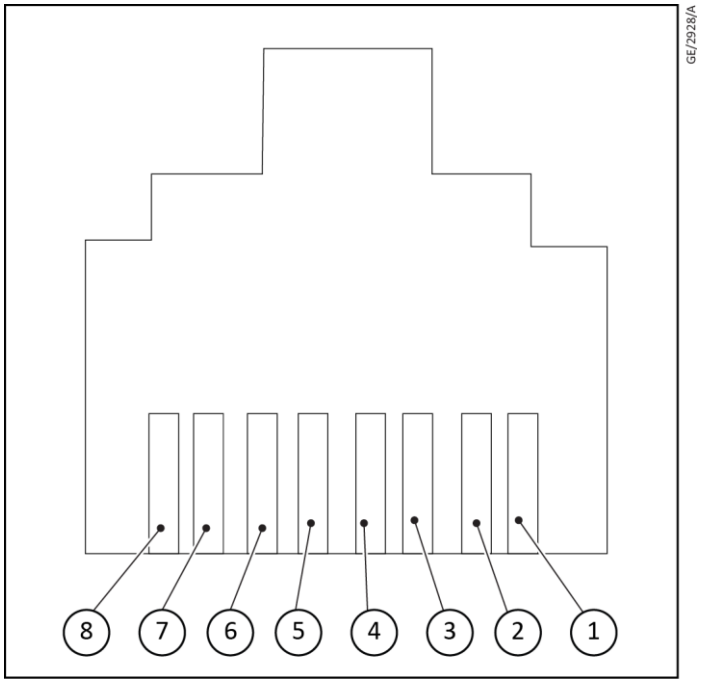
Making an EtherCAT interface cable

For operating the temperature controlled Barocel 7045/Barocel 7100 gauge through EtherCAT, two interface cables conforming to the EtherCAT standard are required.

If no such cables are available, make two as follows:

1. Cable type - Ethernet patch cable (CAT5e quality) with FCC68 connector.
2. Procedure:
   - Pin assignment:

Figure 1 FCC68, 8-pin, soldering side



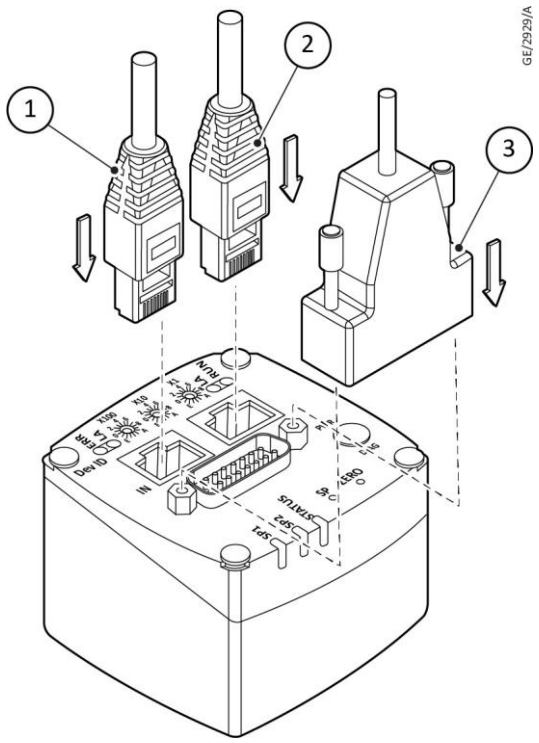
Pin	Signal	Description
1	TD+	Transmission Data +
2	TD-	Transmission Data -
3	RD+	Receive Data +
4	nu	not used
5	nu	not used
6	RD-	Receive Data -
7	nu	not used
8	nu	not used

Pin assignment of the D-sub 15-pin sensor connector is according to the respective operating manual.

- Plug the EtherCAT (and sensor) cables connector into the gauge:

  From the previous device, the cable connected to the OUT port must be connected to the Barocel <IN> port. And the cable from the Barocel <OUT> port has to be connected to the next device's <IN> port.

Figure 2 EtherCAT connector



1. FCC68 cable <IN> port *2. FCC68 cable <OUT> port*
3. Sensor cable

5. Technical data

5.1 Table: EtherCAT interface

Table 1 EtherCAT interface

Communication protocol	Protocol specialised for EtherCAT
Communication standards	ETG.5003.1 S (R) V1.1.0: Part 1 Common Device Profile (CDP) ETG.5003.2080 S (R) V1.3.0: Part 2080: Specific Device Profile (SDP) vacuum pressure gauge
Data rate	100 Mbps
Node address	Explicit Device Identification
Physical layer	100BASE-Tx (IEEE 802.3)
EtherCAT connector	2 × RJ45, 8-pin (socket) <IN>: EtherCAT input <OUT>: EtherCAT output
Cable	Shielded, special Ethernet patch cable (CAT5e quality or higher)
Cable length	≤ 100 m
Process data	Fixed PDO mapping and configurable PDO mapping
Mailbox (CoE)	SDO requests, responses and information

6. Operation

CAUTION: DATA TRANSMISSION ERRORS

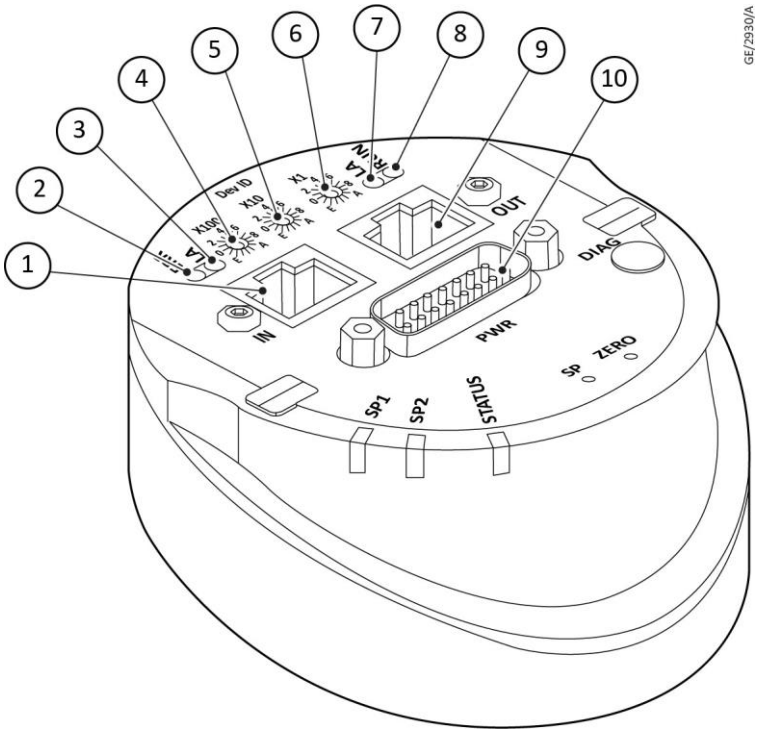
Risk of transmission errors. Any attempt to simultaneously operate the gauge with the RS232C serial interface and EtherCAT may result in incorrect data and data transmission errors.
So do not simultaneously operate the gauge with the RS232C serial interface and EtherCAT interface.

Through the EtherCAT interface, the following data is exchanged in the standardised EtherCAT protocol:

- Pressure reading
- Pressure unit (Torr, mbar, Pa)
- Zero adjustment
- Status and error messages
- Status of the switching functions
- Set trip point for switching functions.

6.1 Front view

Figure 3 Front view



Position	Label	Function
1	IN	EtherCAT IN connector
2	ERR	Error LED
3	LA	Link activity EtherCAT IN
4	x100	Address switch × 100, hexadecimal
5	x10	Address switch × 10, hexadecimal
6	x1	Address switch × 1, hexadecimal
7	LA	Link activity EtherCAT OUT
8	RUN	EtherCAT status LED
9	OUT	EtherCAT OUT connector
10	PWR	Sensor cable connector (Power, analogue I/O, RS232C I/O and Relay contacts)

6.2 Indicators and switches

6.2.1 <RUN> LED

<RUN> LED displays the operating status.

Colour	LED state	Description
Green	off	INIT (initialisation status) or no power applied to the device.
	blinking (200 ms on 200 ms off)	PREOP (pre-operational status).
Green	single flash (200 ms on 1000 ms off)	SAFEOP (safe-operational status). Communication of cyclic data transfer running. Input values available, output values are written to the device but not updated on device output.
	on	OP (operational status).

6.2.2 <ERR> LED

<ERR> LED displays the error content.

Colour	LED state	Description
Red	off	No error or no power applied to the device.
	blinking (200 ms on 200 ms off)	An error occurred (see error parameter).
	single flash (200 ms on 1000 ms off)	The secondary interface device application has changed the EtherCAT state autonomously, due to local error (see error parameter).
	double flash (200 ms on 200 ms off 200 ms on 1000 ms off)	An application watchdog timeout has occurred. Sync manager watchdog timeout or communication timeout occurred.
	on	A critical communication or application controller error has occurred. The application controller is not responding any more (PDI watchdog timeout detected by ESC)

6.2.3 <LA> LED (<IN> port)

<LA> LED (<IN> port) displays the input status.

Colour	LED state	Description
Green	off	Port not connected or no power applied to the device.
	blinking	Port connected and communication active.
	on	Port connected but no communication.

6.2.4 <LA> LED (<OUT> port)

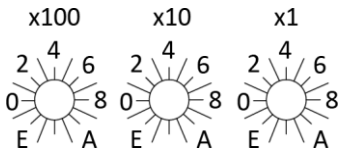
<LA> LED (<OUT> port) displays the output status.

Colour	LED state	Description
Green	off	Port not connected or no power applied to the device.
	blinking	Port connected and communication active.
	on	Port connected but no communication.

6.2.5 Device address switch

During device initialisation, the device address switches are read by the device firmware. This device address is supported to the primary interface as Explicit Device Identification.

Example: Value of the Explicit Device ID = 0xDDD (dec 3549):
0x100 * 0xD (dec 3328) + 0x10 * 0xD (dec 208) + 0x1 * 0xD (dec 13)



7. Object structure Barocel 7025, Barocel 7045, Barocel 7100

This chapter describes the CANopen over EtherCAT (CoE) object dictionary.

7.1 Object dictionary structure

The objects in the CoE object dictionary can be accessed with SDO services and many of the dictionary objects can be mapped for cyclic communication in PDO's. Each object is addressed using a 16-bit index and an 8-bit subindex.

The following table shows the overall layout of the standard object dictionary.

Index (hex.)	Object dictionary area	
1000 – 1FFF	Communication profile area	
2000 – 5FFF	Manufacturer-specific profile area	
6000 – 6FFF	Profile Specific Area	Input area
7000 – 7FFF		Output area
8000 – 8FFF		Configuration area
9000 – 9FFF		Information area
A000 – AFFF		Diagnosis area
B000 – BFFF		Service Transfer area
C000 – EFFF		Reserved area
F000 – FFFF		Device area

Explanations for the abbreviations are as follows:

Abbreviation	Description
Access	SDO read/write access ▪ RO: object can only be read by the SDO service. ▪ RW: object can be both read and written by the SDO service.
CoE	CAN application protocol over EtherCAT.
Index	Object Index (hex.) (address of an object).
NV	The nonvolatile, attribute value is maintained through power cycles.
Object	Abstract representation of a particular component within a device, which consists of data, parameters and methods.
PDO	Process Data Object. The structure described by mapping parameters containing one or several process data entities.
PM	PDO mapping ▪ Rx: object can be mapped into an R x PDO ▪ Tx: object can be mapped into a T x PDO
R x PDO	Receive PDO. A Process Data Object received by secondary EtherCAT interface.

Abbreviation	Description
SDO	Service Data Objects. CoE asynchronous mailbox communications where all objects in the Object Dictionary can be read and written.
SI	Subindex (hex.) (sub-address of an object)
Type	Data type ▪ BOOL, BIT = 1 bit. Boolean (0 = false, 1 = true) ▪ SINT, BYTE = 8 bit. Unsigned byte ▪ UINT = 16 bit. Unsigned integer value ▪ UDINT = 32 bit. Unsigned integer value ▪ ULINT = 64 bit. Unsigned integer value ▪ REAL = 32 bit. Floating point ▪ V_STRING = 8 × n bit. Visible string (1 byte for character).
TxPDO	Transmit PDO. A Process Data Object sent from secondary EtherCAT interface.

7.2 Communication profile objects (0x1000…0x1FFF)

The objects of the communication profile describe the basic EtherCAT properties of the Barocel and are common to all EtherCAT secondary interface using the CoE communication protocol. The objects are described as follows:

Index	SI	Data type	NV	Access	PM	Name
1000		UDINT		RO		Device type
1008		V_STRING		RO		Manufacturer device name
1009		V_STRING		RO		Manufacturer hardware version
100A		V_STRING		RO		Manufacturer software version
100B		V_STRING		RO		Manufacturer bootloader version
1010	0 x 01	UDINT		RW		Store parameters Read: Bit 0 = 1: secondary interface saves the backup entries when writing 0 x 1010:01 with 0 x 65766173 Bit 1-31 = 0 Write: With the value 0 x 65766173, the backup entries will be stored to non-volatile memory of the secondary interface

Index	SI	Data type	NV	Access	PM	Name
1011	0 x 01	UDINT		RW		Restore default parameters Read: Bit 0 = 1: secondary interface supports the restoring of backup entries with the default values when writing 0 x 1011:01 with 0 x 64616F6C Bit 1-31 = 0 Write: With the value 0 x 64616F6C, the backup entries will be restored with the default values
1018				RO		Identity object
	0 x 01	UDINT		RO		Vendor ID
	0 x 02	UDINT		RO		Product code
	0 x 03	UDINT		RO		Revision number
	0 x 04	UDINT		RO		Serial number
10F8		ULINT		RO		Timestamp object

7.2.1 Process Data Objects (PDO's)

Barocel gauges only: They consist of one vacuum pressure sensor with an additional sensor measuring the ambient pressure (ATM). For each sensor module, a default mapping is configured.

Or to meet other requirements the T x PDO's 1A01, 1A03 or 1BFF and the R x PDO 1601 are designated for user mapping. These PDO's do not have default values and can be set up by the PDO configuration.

R x PDO's

Index	SI	Data type	NV	Access	PM	Name
1600		PM		RW		RxPDO Receive PDO Mapping
1601		PM		RW		RxPDO Receive PDO Mapping, User Mapping

T x PDO's

Index	SI	Data type	NV	Access	PM	Name
1A00		PM		RW		TxPDO Transmit PDO mapping
	0 x 01	BIT				Reading valid (Module 1)
	0 x 02	BIT				Over range exceeded (Module 1)
	0 x 03	BIT				Under range exceeded (module 1)
	0 x 04	BIT				Padding bits 1 (5 bit)
	0 x 05	REAL				Sensor value (module 1)

Index	SI	Data type	NV	Access	PM	Name
1A01		PM		RW		TxPDO Transmit PDO mapping, user mapping
1A02		PM		RW		TxPDO Transmit PDO mapping
	0 x 01	BIT				Reading valid (module 2)
	0 x 02	BIT				Over range exceeded (module 2)
	0 x 03	BIT				Under range exceeded (module 2)
	0 x 04	BIT				Padding bits 1 (5 bit)
	0 x 05	REAL				Sensor value (module 2)
1A03		PM		RW		TxPDO Transmit PDO Mapping, user mapping
1BFE		PM		RW		Transmit PDO Mapping
	0 x 01	BYTE				Active exception status
	0 x 02	UDINT				Trip point output all instance
1BFF		PM		RW		Transmit PDO Mapping, user mapping
1C00	0 x 01 0 x 02 0 x 03 0 x 04	BYTE		RW		Sync manager type
1C12 / 1C13	0 x 01 0 x 02 0 x 03 0 x 04	UINT		RW		Sync manager PDO assignment
1C32 / 1C33	0 x 01 - 0 x 20			RW		Sync manager parameter

7.3 Manufacturer-specific profile objects (0 x 2000...0 x 5FFF)

The manufacturer-specific profile objects contain the manufacturer's model number and device configuration data, status and diagnostic data. The objects are described in the following tables.

7.3.1 Manufacturer status

Index	SI	Data type	NV	Access	PM	Name
2000	0 x 01	BYTE		RO		Status

Subindex 0 x 01

Alarm and warning state of module 1	
Bit 0	High alarm exception (0 = cleared, 1 = set)
Bit 1	Low alarm exception (0 = cleared, 1 = set)
Bit 2	High warning exception (0 = cleared, 1 = set)
Bit 3	Low warning exception (0 = cleared, 1 = set)

Alarm and warning state of module 1	
Bit 4…7	0

7.3.2 Configuration capacitance diaphragm (module 1)

Index	SI	Data type	NV	Access	PM	Name
4000	0 x 01	BYTE		RW		Safe state
	0 x 02	REAL		RW		Safe value
	0 x 03	BOOL		RW		Alarm enable
	0 x 04	BOOL		RW		Warning enable
	0 x 05	REAL		RW		Alarm trip point high
	0 x 06	REAL		RW		Alarm trip point low
	0 x 07	REAL		RW		Alarm hysteresis
	0 x 08	REAL		RW		Warning trip point high
	0 x 09	REAL		RW		Warning trip point low
	0 x 0A	REAL		RW		Warning hysteresis
	0 x 0B	BYTE		RW		Filter

Subindex 0 x 01	Specifies the behaviour for the value for states other than valid.	
	Safe state	
	0	Zero
	1	Full Scale
	2	Hold last value
	3	Use safe value
Subindex 0 x 02	Safe value: The value to be used for a safe state.	
Subindex 0 x 03	Alarm enable: Enables the setting of the Alarm status bits.	
Subindex 0 x 04	Warning enable: Enables the setting of the Warning status bits.	
Subindex 0 x 05	Alarm trip point high: Determines the value above which an alarm condition will occur.	
Subindex 0 x 06	Alarm trip point low: Determines the value below which an alarm condition will occur.	
Subindex 0 x 07	Alarm hysteresis: Determines the amount by which the value must recover to clear an Alarm condition.	
Subindex 0 x 08	Warning trip point high: Determines the value above which a warning condition will occur.	
Subindex 0 x 09	Warning trip point low: Determines the value below which a warning condition will occur.	
Subindex 0 x 0A	Warning hysteresis: Determines the amount by which the value must recover to clear a warning condition.	
Subindex 0 x 0B	Filter	
	0	Dynamic (factory default)

	1	Fast
	2	Slow

7.3.3 Configuration capacitance diaphragm (module 2)

Index	SI	Data type	NV	Access	PM	Name
4010	0 x 01	BYTE		RW		Safe state
	0 x 02	REAL		RW		Safe value

Subindex 0 x 01	Specifies the behaviour for the value for states other than valid.	
	Safe state	
	0	Zero
	1	Full scale
	2	Hold last value
	3	Use safe value
Subindex 0 x 02	Safe value: The value to be used for a safe state.	

7.4 Input area (0x6000…0x6FFF)

7.4.1 Input common capacitance diaphragm

Index	SI	Data type	NV	Access	PM	Name
6000	0 x 0E	BOOL		RO	tx	TxPdoState
	0 x 11	REAL		RO	tx	Sensor value

Subindex 0 x 0E	Is set if the device is not in safe state (value (I 0 x 6nn0, SI 0 x 11) = valid).	
	TxPdoState	
	0	Invalid
	1	Valid
Subindex 0 x 11	The corrected, converted, calibrated final analogue input value of the sensor.	

7.4.2 Input capacitance diaphragm

Index	SI	Data type	NV	Access	PM	Name
6001	0 x 01	BOOL		RO	tx	Reading valid
	0 x 02	BOOL		RO	tx	Over range exceeded
	0 x 03	BOOL		RO	tx	Under range exceeded

Subindex 0 x 01	Indicates whether the value parameter contains a valid value within the specified accuracy or not.	
	Reading valid	
	0	Invalid
	1	Valid
Subindex 0 x 02	Indicates whether the value parameter contains a value in over range.	
	Reading valid	
	0	No over range exceeded
	1	Over range exceeded
Subindex 0 x 03	Indicates whether the value parameter contains a value in under range.	
	Reading valid	
	0	No under range exceeded
	1	Under range exceeded

7.4.3 Input trip point 1

Index	SI	Data type	NV	Access	PM	Name
600E	0 x 01	BOOL		RO	tx	Status high trip
	0 x 02	BOOL		RO	tx	Status low trip

Subindex 0 x 01	Status high trip	
	0	High trip not assert
	1	High trip assert
Subindex 0 x 02	Status low trip	
	0	Low trip not assert
	1	Low trip assert

7.4.4 Input trip point 2

Index	SI	Data type	NV	Access	PM	Name
600F	0 x 01	BOOL		RO	tx	Status high trip
	0 x 02	BOOL		RO	tx	Status low trip

Subindex 0 x 01	Status high trip	
	0	High trip not assert
	1	High Trip assert
Subindex 0 x 02	Status low trip	
	0	Low trip not assert
	1	Low trip assert

7.5 Configuration area (0x8000…0x8FFF)

7.5.1 Configuration capacitance diaphragm

Index	SI	Data type	NV	Access	PM	Name
8001	0 x 12	REAL	x	RW		Offset customer specific

Subindex 0 x 12

Customer-specified offset shall be added to the value parameter of the analogue input sensor instance.

The offset customer specified parameter is a value added from a zero adjust service to the reported pressure value.

The value is calculated as:

Value * = Reported pressure value + AZO ** + OCS ***

** Value (I: 0x6000, SI: 0x11)*

*** Accumulated Zero Offset (I: 0x9000, SI: 0x01)*

**** Offset Customer Specified (I: 0x8001, SI: 0x12).*

7.5.2 Configuration trip point

The high trip point is calculated by:

High trip point = Value * × Percentage **

** Value from piezo sensor (I: 0 x 6010, SI: 0 x 11)*

*** Percentage high trip source (I: 0 x 800E/F, SI: 0 x 13)*

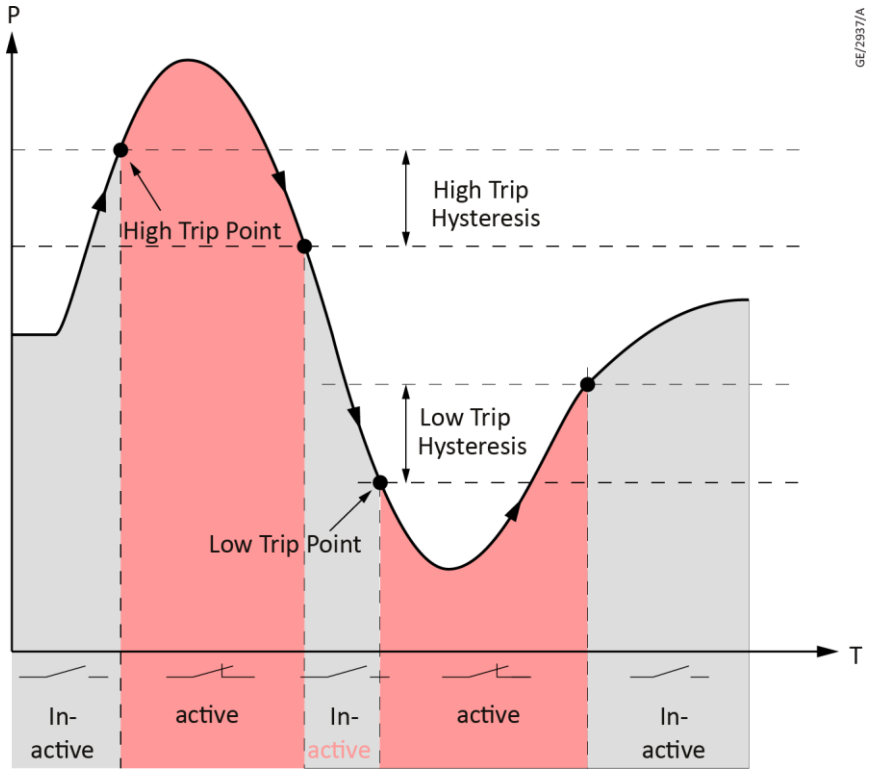
In this case, the high trip point value is automatically updated by the device itself. Any user-written value to the parameter high trip will be refused with an abort code.

Note:

Usage of the high trip point is only recommended for measurement range 1000 Torr.

The low trip point is a fixed value.

The value defined in the low trip point limit is compared with the pressure value referenced by the source index parameter.



7.5.3 Configuration trip point 1

For calculating the high trip point and low trip point, refer to *Configuration trip point* on page 25.

Index	SI	Data type	NV	Access	PM	Name
800E	0 x 01	BOOL	x	RW		High trip enable
	0 x 02	BOOL	x	RW		Low trip enable
	0 x 11	REAL	x	RW		High trip point limit
	0 x 13	REAL	x	RW		Percentage high trip source
	0 x 14	REAL	x	RW		Low trip point limit
	0 x 17	REAL	x	RW		High trip hysteresis
	0 x 18	REAL	x	RW		Low trip hysteresis
	0 x 1A	UDINT	x	RO		Source index

Subindex 0 x 01	High trip point	
	0	Disable
	1	Enable
Subindex 0 x 02	Low trip point	
	0	Disable
	1	Enable
Subindex 0 x 11	High trip point limit: High limit to trigger trip point condition if input value (I 0 x 900E, SI 0 x 01) is above this limit.	

Subindex 0 x 13	Percentage of high trip source: Percentage of piezo sensor value (I 0 x 6010, SI 0 x 11) in [%].	
Subindex 0 x 14	Low trip point limit: Low limit to trigger trip point condition if input value (I 0 x 900E, SI 0 x 01) is below this limit.	
Subindex 0 x 17	High trip hysteresis: Hysteresis value for the high trip point.	
Subindex 0 x 18	Low trip hysteresis: Hysteresis value for the low trip point.	
Subindex 0 x 1A	Object index of active source of (I 0 x 900E SI 0 x 01) input value.	
	Source index	
	Bit 16…31	Index
	Bit 08…15	Sub-index
	Bit 00…07	Reserved

7.5.4 Configuration trip point 2

For calculating the high trip point and low trip point, refer to *Configuration trip point* on page 25.

Index	SI	Data type	NV	Access	PM	Name
800F	0 x 01	BOOL	x	RW		High trip enable
	0 x 02	BOOL	x	RW		Low trip enable
	0 x 11	REAL	x	RW		High trip point limit
	0 x 13	REAL	x	RW		Percentage high trip source
	0 x 14	REAL	x	RW		Low trip point limit
	0 x 17	REAL	x	RW		High trip hysteresis
	0 x 18	REAL	x	RW		Low trip hysteresis
	0 x 1A	UDINT	x	RW		Source index

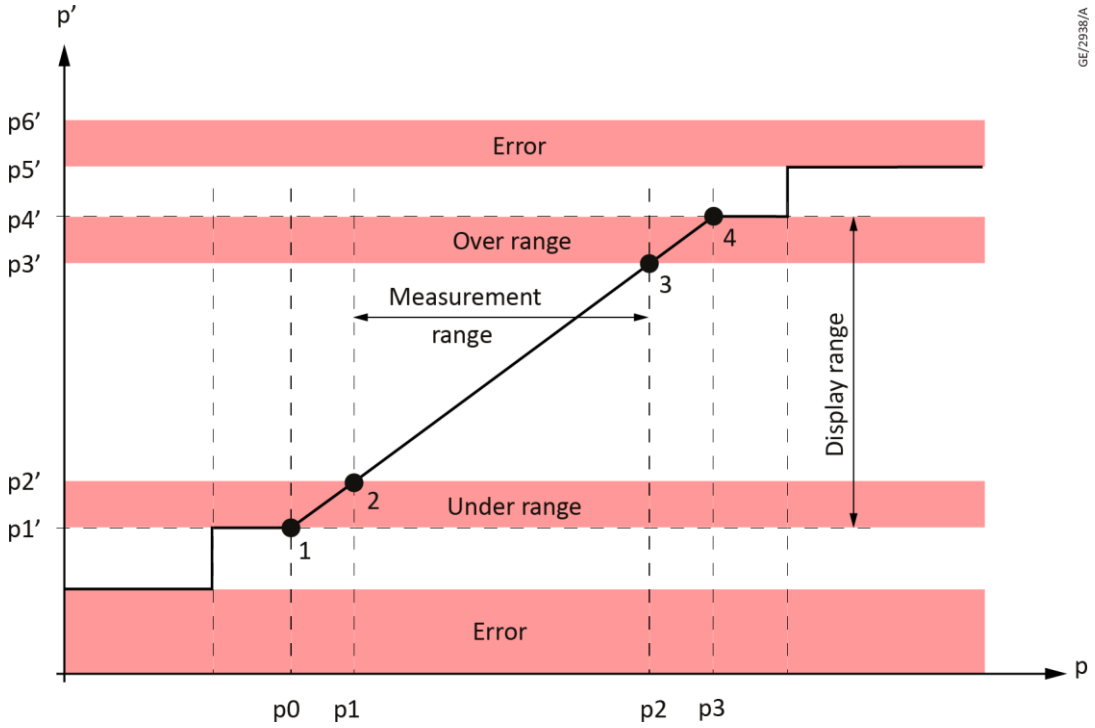
Subindex 0 x 01	High trip point	
	0	Disable
	1	Enable
Subindex 0 x 02	Low trip point	
	0	Disable
	1	Enable
Subindex 0 x 11	High trip point limit: High limit to trigger trip point condition if input value (I 0 x 900F, SI 0 x 01) is above this limit.	
Subindex 0 x 13	Percentage of high trip source: Percentage of piezo sensor value (I 0 x 60010, SI 0 x 11) in [%].	
Subindex 0 x 14	Low trip point limit: Low limit to trigger trip point condition if input value (I 0 x 900F, SI 0 x 01) is below this limit.	
Subindex 0 x 17	High trip hysteresis: Hysteresis value for the high trip point.	
Subindex 0 x 18	Low trip hysteresis: Hysteresis value for the low trip point.	

Subindex 0 x 1A	Object index of active source of (I 0 x 900F SI 0 x 01) input value.	
	Source index	
	Bit 16…31	Index
	Bit 08…15	Sub index
	Bit 00…07	Reserved

7.6 Information area (0x9000…0x9FFF)

The information data object defines the input process data.

Highest/lowest measurement value



The measurement range is the range between minimum and maximum pressure, where the reading of the gauge is within the specified measurement uncertainty limits.

The "valid measurement information range" (display range) is the complete pressure range where the gauge gives an indication (measurement signal). The valid measurement information range (display range) consists of under range, measurement range and over range.

According to these definitions, 4 points are defined:

1. Lowest informational measurement value
2. Lowest precision measurement value
3. Highest precision measurement value
4. Highest informational measurement value.

7.6.1 Information common capacitance diaphragm

Index	SI	Data type	NV	Access	PM	Name
9000	0 x 01	REAL	x	RO		Accumulated zero offset
	0 x 02	REAL	x	RO		Highest informational measurement value
	0 x 03	REAL	x	RO		Highest precision measurement value
	0 x 04	REAL	x	RO		Lowest precision measurement value
	0 x 05	REAL	x	RO		Lowest informational measurement value

Subindex 0 x 01	Accumulated zero offset: An amount added prior to gain to derive value. Result of zero adjust command (accumulated value).
Subindex 0 x 02	Highest informational measurement value: Highest value that the gauge can measure without a specified accuracy.
Subindex 0 x 03	Highest precision measurement value: Highest valid value at which the gauge is specified with an accuracy value. Above that value, the parameter reading valid is set to invalid.
Subindex 0 x 04	Lowest precision measurement value: Lowest valid value at which the gauge is specified with an accuracy value. Below that value, the parameter reading valid is set to invalid.
Subindex 0 x 05	Lowest informational measurement value: Lowest value that the gauge can measure without a specified accuracy.

7.6.2 Information capacitance diaphragm

Index	SI	Data type	NV	Access	PM	Name
9001	0 x 01	UINT		RO		Sensor warning
	0 x 02	UINT		RO		Sensor error

Subindex 0 x 01	Sensor warnings	
	Bit 0	Not at temperature
	Bit 1	Electronics warning
	Bit 2…13	0

	Bit 14	Low warning exception
	Bit 15	High warning exception
Subindex 0 x 02	Sensor errors	
	Bit 0	0
	Bit 1	Electronics failure
	Bit 2	Electronics over-temperature
	Bit 3…13	0
	Bit 14	Low error exception
	Bit 15	High error exception

7.6.3 Information trip point 1/2

Index	SI	Data type	NV	Access	PM	Name
900E	0 x 01	REAL		RO		Input value trip point 1
900F	0 x 01	REAL		RO		Input value trip point 2

Subindex 0 x 01 (900E)	Input value trip point 1: Trip point input value as referenced by source index (I 0 x 800E, SI 0 x 0E).
Subindex 0 x 02	Number of modules: Barocel has always 2.

7.7 Device area (0xF000...0xAFFF)

7.7.1 Semiconductor device profile

Index	SI	Data type	NV	Access	PM	Name
F000	0x01	UINT		RO		Index distance
	0x02	UINT		RO		Maximum number of modules

Subindex 0 x 01	Index distance: Index offset between PDO entries of two consecutive modules (for ETG.5003 = 0x10), for example, 0 x 6000, 0 x 6010.
Subindex 0 x 02	Number of modules: Barocel has always 2.

7.7.2 Module profile list

Index	SI	Data type	NV	Access	PM	Name
F010	0 x 01	UDINT		RO		Profile number (module 1)
	0 x 02	UDINT		RO		Profile number (module 2)

Subindex 0 x 01	Each sub-index lists the profile number of the corresponding module.
Subindex 0 x 02	Each sub-index lists the profile number of the corresponding module.

7.7.3 Exceptions

Active exception status

Index	SI	Data type	NV	Access	PM	Name
F380		USINT		RO	tx	Active exception Status

Active exception status	
Bit 0	Device warning
Bit 1	Manufacturer warning
Bit 2	Device error
Bit 3	Manufacturer error
Bit 4…7	0

7.7.4 Active device warning details

The "active device warning details" parameter describes the warning state of the complete device.

Index	SI	Data type	NV	Access	PM	Name
F381	0 x 01	UDINT		RO	tx	Active device warning details
	0 x 02	UDINT		RO	tx	Active device warning details
F382	0 x 01	UDINT		RO	tx	Active manufacturer warning details
	0 x 02	UDINT		RO	tx	Active manufacturer warning details

Subindex 0 x 01 (F381)	Active device warning details (index F381, module 1)	
	Bit 0	Not at temperature
	Bit 1	Electronics warning
	Bit 2…13	0
	Bit 14	Low warning exception
	Bit 15	High warning exception
	Bit 16…31	0
Subindex 0 x 02 (F381)	Active device warning details (index F381, module 2)	

	Bit 0…31	0
Subindex 0 x 01 (F382)	Active manufacturer warning details (index F382, module 1)	
	Bit 0…31	0
Subindex 0 x 02 (F382)	Active manufacturer warning details (index F382, module 2)	
	Bit 0…31	0

7.7.5 Active device error details

The "active device error details" parameter describes the error state of the complete device.

Index	SI	Data type	NV	Access	PM	Name
F383	0 x 01	UDINT		RO	tx	Active device error details
	0 x 02	UDINT		RO	tx	Active device error details
F384	0 x 01	UDINT		RO	tx	Active manufacturer error details
	0 x 02	UDINT		RO	tx	Active manufacturer error details

Subindex 0 x 01 (F383)	Active device error details (index F383, module 1)	
	Bit 0	0
	Bit 1	Electronics failure
	Bit 2	Electronics over-temperature
	Bit 3…13	0
	Bit 14	Low error exception
	Bit 15	High error exception
	Bit 16…31	0 (reserved)
Subindex 0 x 02 (F383)	Active device error details (index F383, module 2)	
	Bit 0…31	0
Subindex 0 x 01 (F384)	Active manufacturer error details (index F384, module 1)	
	Bit 0…31	0
Subindex 0 x 02 (F384)	Active manufacturer error details (index F384, module 2)	
	Bit 0…31	0

7.7.6 Active global device warning details

The "active device warning details" parameter describes the warning state of the complete device.

Index	SI	Data type	NV	Access	PM	Name
F385	0 x 01	UDINT		RO	tx	Active global device warning details
F386	0 x 01	UDINT		RO	tx	Active global manufacturer warning details

Subindex 0 x 01 (F385)	Active global device warning details(index F385)	
	Bit 0…2	0
	Bit 3	EEPROM exception
	Bit 4…31	0
Subindex 0 x 01 (F386)	Active global manufacturer warning details (index F386)	
	Bit 0	Internal communication exception (between EtherCAT-Protocol and Device-Application)
	Bit 1	Atmosphere pressure out of range exception (only as a warning, 0 for error)
	Bit 2…31	0

7.7.7 Active global device error details

The "active device error details" parameter describes the error state of the complete device.

Index	SI	Data type	NV	Access	PM	Name
F387	0 x 01	UDINT		RO	tx	Active global device error details
F388	0 x 01	UDINT		RO	tx	Active global manufacturer error details

Subindex 0 x 01 (F387)	Active global device error details (index F387)	
	Bit 0…2	0
	Bit 3	EEPROM exception
	Bit 4…31	0
Subindex 0 x 01 (F388)	Active global manufacturer error details (index F388)	
	Bit 0	Internal communication exception (between EtherCAT-Protocol and Device-Application)
	Bit 1	Atmosphere pressure out of range exception (only as a warning, 0 for error)
	Bit 2…31	0

7.7.8 Latched device warning details

Index	SI	Data type	NV	Access	PM	Name
F390		USINT		RO	tx	Latched exceptions status
F391	0 x 01	UDINT		RO	tx	Latched device warning details
	0 x 02	UDINT		RO	tx	Latched device warning details
F392	0 x 01	UDINT		RO	tx	Latched manufacturer warning details
	0 x 02	UDINT		RO	tx	Latched manufacturer warning details

Latched exceptions status	Latched version of 0 x F380.
Subindex 0 x 01 (F391)	Latched device warning details: Latched version of 0 x F381:01.
Subindex 0 x 02 (F391)	Latched device warning details: Latched version of 0 x F381:02.
Subindex 0 x 01 (F392)	Latched manufacturer warning details: Latched version of 0 x F382:01.
Subindex 0 x 02 (F392)	Latched manufacturer warning details: Latched version of 0 x F382:02.

7.7.9 Latched device error details

Index	SI	Data type	NV	Access	PM	Name
F393	0 x 01	UDINT		RO	tx	Latched device error details
	0 x 02	UDINT		RO	tx	Latched device error details
F394	0 x 01	UDINT		RO	tx	Latched manufacturer error details
	0 x 02	UDINT		RO	tx	Latched manufacturer error details

Subindex 0 x 01 (F393)	Latched device error details: Latched version of 0 x F383:01.
Subindex 0 x 02 (F393)	Latched device error details: Latched version of 0 x F383:02.
Subindex 0 x 01 (F394)	Latched manufacturer error details: Latched version of 0 x F384:01.
Subindex 0 x 02 (F394)	Latched manufacturer error details: Latched version of 0 x F384:02.

7.7.10 Latched global device warning details

Index	SI	Data type	NV	Access	PM	Name
F395	0 x 01	UDINT		RO	tx	Latched global device warning details

Index	SI	Data type	NV	Access	PM	Name
F396	0 x 01	UDINT		RO	tx	Latched global manufacturer warning details

Subindex 0 x 01 (F395)	Latched global device warning details: Latched version of 0 x F385:01.
Subindex 0 x 01 (F396)	Latched global manufacturer warning details: Latched version of 0 x F386:01.

7.7.11 Latched global device error details

Index	SI	Data type	NV	Access	PM	Name
F397	0 x 01	UDINT		RO	tx	Latched global device error details
F398	0 x 01	UDINT		RO	tx	Latched global manufacturer error details

Subindex 0 x 01 (F397)	Latched global device error details: Latched version of 0 x F387:01.
Subindex 0 x 01 (F398)	Latched global manufacturer error details: Latched version of 0 x F388:01.

7.7.12 Device warning mask

Index	SI	Data type	NV	Access	PM	Name
F3A1	0 x 01	UDINT	x	RW		Device warning mask
	0 x 02	UDINT	x	RW		Device warning mask
F3A2	0 x 01	UDINT	x	RW		Manufacturer warning mask
	0 x 02	UDINT	x	RW		Manufacturer warning mask

Subindex 0x01 (F3A1)	Device warning mask: Mask bits for 0 x F381:01 and 0 x F391:01.
Subindex 0x02 (F3A1)	Device warning mask: Mask bits for 0 x F381:02 and 0 x F391:02.
Subindex 0x01 (F3A2)	Manufacturer warning mask: Mask bits for 0 x F382:01 and 0 x F392:01.
Subindex 0x02 (F3A2)	Manufacturer warning mask: Mask bits for 0 x F382:02 and 0 x F392:02.

7.7.13 Device error mask

Index	SI	Data type	NV	Access	PM	Name
F3A3	0 x 01	UDINT	x	RW		Device error mask
	0 x 02	UDINT	x	RW		Device error mask
F3A4	0 x 01	UDINT	x	RW		Manufacturer error mask
	0 x 02	UDINT	x	RW		Manufacturer error mask

Subindex 0 x 01 (F3A3)	Device error mask: Mask bits for 0 x F383:01 and 0 x F393:01.
Subindex 0 x 02 (F3A3)	Device error mask: Mask bits for 0 x F383:02 and 0 x F393:02.
Subindex 0 x 01 (F3A4)	Manufacturer error mask: Mask bits for 0 x F384:01 and 0 x F394:01.
Subindex 0 x 02 (F3A4)	Manufacturer error mask: Mask bits for 0 x F384:02 and 0 x F394:02.

7.7.14 Global device warning mask

Index	SI	Data type	NV	Access	PM	Name
F3A5	0 x 01	UDINT	x	RW		Global device warning mask
F3A6	0 x 01	UDINT	x	RW		Global manufacturer warning mask

Subindex 0 x 01 (F3A5)	Global device warning mask: Mask bits for 0 x F385:01 and 0 x F395:01.
Subindex 0x01 (F3A6)	Global manufacturer warning mask: Mask bits for 0 x F386:01 and 0 x F396:01.

7.7.15 Global device error mask

Index	SI	Data type	NV	Access	PM	Name
F3A7	0 x 01	UDINT	x	RW		Global device error mask
F3A8	0 x 01	UDINT	x	RW		Global manufacturer error mask

Subindex 0 x 01 (F3A7)	Global device error mask: Mask bits for 0 x F387:01 and 0 x F397:01.
Subindex 0 x 01 (F3A8)	Global manufacturer error mask: Mask bits for 0x F388:01 and 0 x F398:01.

7.7.16 Manufacturer information device

Index	SI	Data type	NV	Access	PM	Name
F500		V_STRING		RO		Manufacturer's model number
F501		V_STRING		RO		Device configuration

7.7.17 Trip point output all

Index	SI	Data type	NV	Access	PM	Name
F641	0 x 01	UDINT		RO	tx	Trip point output all instance

Subindex 0 x 01	Status of trip point instances	
	Trip point output all instance	
	Bit 0	Status high trip (I 0 x 600E, SI 0 x 01)
	Bit 1	Status Low Trip (I 0 x 600E S,I 0 x 02)
	Bit 2	Status High Trip (I 0 x 600F, SI 0 x 01)
	Bit 3	Status Low Trip (I 0 x 600F, SI 0 x 02)
	Bit 4…31	not used = 0

7.7.18 Input latch local timestamp

Index	SI	Data type	NV	Access	PM	Name
F6F0	0 x 01	UDINT		RO	tx	Input latch local timestamp. Mandatory if the device has inputs (TxPDOs)
	0 x 02	UDINT		RO	tx	Input latch local timestamp. Mandatory if the device has inputs (TxPDOs)

Subindex 0 x 01	Local controller time corresponding to the input latch time in microseconds. It starts at zero on device power-up. Mandatory if the device has inputs. If the device has no inputs defined, this corresponds to the time immediately prior to writing to input SM.
Subindex 0 x 02	Local controller time corresponding to the input latch time in microseconds. It starts at zero on device power-up. Mandatory if the device has inputs. If the device has no inputs defined, this corresponds to the time immediately prior to writing to input SM.

7.7.19 Configure device

Index	SI	Data type	NV	Access	PM	Name
F840	0 x 01	UDINT	x	RW		Data Units
	0 x 03	Enum	x	RW		Data Units Enum

Subindex 0 x 01	Unit of the value of the analogue input sensor instance and all related parameters.	
	Trip point output all instance	
	0 x 00220000	Pascal
	0 x FD4E0000	mbar
	0 x 00A10000	Torr

If this value is changed, Subindex 3 will also change the value accordingly.

Subindex 0 x 03	Data unit for input sensor as Enum to have a list of possible values.	
	Data units	
	0 x 01 (Pa)	Pascal
	0 x 04 (mBar)	mbar
	0 x 05 (Torr)	Torr

If this value is changed, Subindex 1 will also change the value accordingly.

7.7.20 Information device

Index	SI	Data type	NV	Access	PM	Name
F940	0 x 01	UDINT		RO		Measurement principle
	0 x 02	BYTE		RO		Number of sensors
	0 x 04	V_STRING	x	RO		SW version VPG PCB
F9F0		V_STRING		RO		Manufacturer serial number
F9F1	0 x 01	UDINT		RO		CDP functional generation number
F9F2	0 x 01	UDINT		RO		SDP functional generation number (module 1)
	0 x 02	UDINT		RO		SDP functional generation number (module 2)
F9F3		V_STRING		RO		Vendor name
F9F4	0 x 01	V_STRING		RO		Semiconductor SDP device name (module 1)
	0 x 02	V_STRING		RO		Semiconductor SDP device name (module 2)
F9F5	0 x 01	USINT		RW	Rx Tx	Output identifier (module 1)
	0 x 02	USINT		RW	Rx Tx	Output identifier (module 2)
F9F6		UDINT		RO		Time since power on
F9F7		UDINT	x	RO		Total time powered

Index	SI	Data type	NV	Access	PM	Name
F9F8		UDINT		RO		Firmware update functional generation number

Subindex 0 x 01 (F940)	Measurement principle assigned to the object instance. The most significant nibble of the parameter represents the sensor type of the first module, the second most significant nibble of the parameter represents the sensor type of the second module and so forth.	
	Measurement principle (index F940)	
	1	Capacitance manometer
Subindex 0 x 02 (F940)	Number of sensors (index F940): The number of sensors implemented on the device.	
Subindex 0 x 04 (F940)	If the device consists out of several software portions this parameter should be used. Using standard a.b.c.d format to describe a version:	
	SW version VPG PCB (index F940)	
	a	Mayor revision
	b	Minor revision
	c	Development revision
	d	Vendor specific
	for example - 1.0.1.2	

7.7.21 Command zero adjust

Execution of this command will start a zero adjust operation.

Note:

The zeroing function is locked to prevent operating errors, so see the operation instructions of the vacuum gauges(refer to the respective manual).

Index	SI	Data type	NV	Access	PM	Name
FB40	0 x 01	V_STRING(6)		RW		Command
	0 x 02	BYTE		RO		Status
	0 x 03	V_STRING(3)		RO		Response

Subindex 0 x 01

Command	
Byte 0	0: Zero adjust with no offset
Byte 1	Index of the sub sensor instance (1)
Byte 2…5	Offset value (data format: REAL, always 0)

Subindex 0 x 02

Status (supported values)	
0	The last command completed, no errors, no reply available
1	The last command completed, no errors, reply available
2	The last command completed, errors present, no reply available
3	The last command completed, errors present, reply available
255	Command is executing

Subindex 0 x 03

Response		
Byte 0	See Subindex 0 x 02	
Byte 1	Unused	
Byte 2	0	Zeroing successful
	1	Zeroing failed, out-of-range
	2	Zeroing failed, cumulative out-of-range
	3	Zeroing failed, measurement invalid
	254	No previous zero adjust command issued

7.7.22 Full scale adjust

Execution of this command will start a full scale adjust operation.

Index	SI	Data type	NV	Access	PM	Name
FB41	0x01	V_STRING(6)		RW		Command
	0x02	BYTE		RO		Status
	0x03	V_STRING(3)		RO		Response

Subindex 0 x 01

Command	
Byte 0	0: Full scale adjust
Byte 1	2: Index of the sub sensor instance (always 2)
Byte 2…5	0: Full scale value (Data format: REAL, always 0)

Subindex 0 x 02

Status (supported values)	
0	The last command completed, no errors, no reply available
1	The last command completed, no errors, reply available
2	The last command completed, errors present, no reply available
3	The last command completed, errors present, reply available
255	Command is executing

Subindex 0 x 03

Response	
Byte 0	See subindex 0 x 02

Response	
Byte 1	Unused
Byte 2	0: Full scale adjust successful 1: Full scale adjust failed: out of range 254: No previous full scale adjust command issued

7.7.23 Device reset command

Execution of this command causes the device to emulate a complete power cycle. This includes an ESC reset.

Note:

As a consequence of an ESC reset all following devices are disconnected from the network.

There are two versions of this command:

- Standard reset (as described above)
- Factory reset (as described above, but additionally, all parameters are restored to as-shipped defaults).

Index	SI	Data type	NV	Access	PM	Name
FBF0	0 x 01	V_STRING(6)		RW		Command
	0 x 02	BYTE		RO		Status
	0 x 03	V_STRING(2)		RO		Response

Subindex 0 x 01

A device reset is initiated when the following byte sequence is sent.

Command	
Byte 0	0 x 74
Byte 1	0 x 65
Byte 2	0 x 73
Byte 3	0 x 65
Byte 4	0 x 72
Byte 5	0 x 00 = Standard reset, 0 x 66 = Factory reset

Subindex 0 x 02

Status (supported values)	
0	Reserved
1	Reserved
2	Last command completed, error, no response
3	Reserved
255	Command is executing

Subindex 0 x 03

Response	
Byte 0	See subindex 0 x 02
Byte 1	not used = 0 x 00

7.7.24 Exception reset command

Execution of this command clears the latched exceptions.

Index	SI	Data type	NV	Access	PM	Name
FBF1	0 x 01	V_STRING(5)		RW		Command
	0 x 02	BYTE		RO		Status
	0 x 03	V_STRING(2)		RO		Response

Subindex 0 x 01

A device reset is initiated when the following byte sequence is sent.

Command	
Byte 0	0 x 74
Byte 1	0 x 65
Byte 2	0 x 73
Byte 3	0 x 65
Byte 4	0 x 72

Subindex 0 x 02

Status (supported values)	
0	The last command completed, no error, no response
1	Reserved
2	The last command completed, error, no response
3	Reserved
255	Command is executing

Subindex 0 x 03

Response	
Byte 0	See Subindex 0 x 02
Byte 1	not used = 0 x 00

7.7.25 Store parameters command

Execution of this command will store all parameters to non-volatile memory. If a device automatically saves all non-volatile parameters at the time they are set, this command will not take any action.

Index	SI	Data type	NV	Access	PM	Name
FBF2	0 x 01	V_STRING(4)		RW		Command
	0 x 02	BYTE		RO		Status

Index	SI	Data type	NV	Access	PM	Name
	0 x 03	V_STRING(2)		RO		Response

Subindex 0 x 01

A device reset is initiated when the following byte sequence is sent.

Command: Read	
Byte 0	0 x 01 = secondary interface saves the non-volatile parameters when writing 0 x FBF2:01 with 0 x 65766173
Byte 1	not used = 0 x 00
Byte 2	not used = 0 x 00
Byte 3	not used = 0 x 00

Command: Write	
Byte 0	0 x 73
Byte 1	0 x 61
Byte 2	0 x 76
Byte 3	0 x 65

Subindex 0 x 02

Status (supported values)	
0	The last command completed, no error, no response
1	Reserved
2	The last command completed, error, no response
3	Reserved
255	Command is executing

Subindex 0x03

Response	
Byte 0	See Subindex 0 x 02
Byte 1	not used = 0 x 00

7.7.26 Calculate checksum command

Execution of this command will calculate a checksum for all writable, non-volatile parameters as currently stored in non-volatile memory.

Index	SI	Data type	NV	Access	PM	Name
FBF3	0 x 01	V_STRING(4)		RW		Command
	0 x 02	BYTE		RO		Status
	0 x 03	V_STRING(6)		RO		Response

Subindex 0 x 01

A device reset is initiated when the following byte sequence is sent.

Command: Read	
Byte 0	Bit 0 = 1: non-volatile parameters supported Bit 1 = 1: CRC-32 Bit 2..7 = 0: not used
Byte 1	not used = 0 x 00
Byte 2	not used = 0 x 00
Byte 3	not used = 0 x 00

Command: Write	
Byte 0	Bit 0 = 1: use default checksum algorithm of the secondary interface Bit 1 = 1: CRC-32 Bit 2..7 = 0: not used
Byte 1	not used = 0 x 00
Byte 2	not used = 0 x 00
Byte 3	not used = 0 x 00

Subindex 0 x 02

Status (supported values)	
0	The last command completed, no error, no response
1	Reserved
2	The last command completed, error, no response
3	Reserved
255	Command is executing

Subindex 0 x 03

Response	
Byte 0	See subindex 0 x 02
Byte 1	not used = 0
Byte 2	Checksum return value, Byte 0
Byte 3	Checksum return value, Byte 1
Byte 4	Checksum return value, Byte 2
Byte 5	Checksum return value, Byte 3

7.7.27 Load parameters command

Execution of this command will load all parameters from non-volatile memory.

Index	SI	Data type	NV	Access	PM	Name
FBF4	0 x 01	V_STRING(4)		RW		Command
	0 x 02	BYTE		RO		Status

Index	SI	Data type	NV	Access	PM	Name
	0 x 03	V_STRING(2)		RO		Response

Subindex 0 x 01

A device reset is initiated when the following byte sequence is sent.

Command: Read	
Byte 0	0 x 01 = secondary interface loads the non-volatile parameters when writing 0 x FBF4:01 with 0 x 64616F6C
Byte 1	not used = 0 x 00
Byte 2	not used = 0 x 00
Byte 3	not used = 0 x 00

Command: Write	
Byte 0	0 x 6C
Byte 1	0 x 6F
Byte 2	0 x 61
Byte 3	0 x 64

Subindex 0 x 02

Status (supported values)	
0	The last command completed, no error, no response
1	Reserved
2	The last command completed, error, no response
3	Reserved
255	Command is executing

Subindex 0 x 03

Response	
Byte 0	See Subindex 0 x 02
Byte 1	not used = 0 x 00

7.8 Overview setting trip points

Input data trip point

Index	Object code	Sub index	Data type	Access	B/S	PM	Name	Description
0 x 6nnx	RECORD			RO			Input trip point 1/2	Trip point 1 / Trip point 2 E = Trip point 1 F = Trip point 2
0 x 600E 0 x 600F	0	0 x 01	BOOL	RO		tx	Status high trip	0: High trip not asserted 1: High trip asserted

Index	Object code	Sub index	Data type	Access	B/S	PM	Name	Description
0 x 600E 0 x 600F	0	0 x 02	BOOL	RO		tx	Status low trip	0: Low trip not asserted 1: Low trip asserted

Trip point configuration

Index	Object code	Sub index	Data type	Access	B/S	PM	Name	Description
0x8nnx	RECORD			RO			Configuration trip point 1/2	Trip point 1 / 2 E = Trip point 1 F = Trip point 2
0x800E 0x800F	0	0 x 01	BOOL	RW	B/S		High trip enable	High trip point 0: disable 1: enable
0x800E 0x800F	0	0 x 02	BOOL	RW	B/S		Low trip enable	Low trip point 0: disable 1: enable
0x800E 0x800F	0	0 x 11	REAL	RW	B/S		High trip point limit	High limit to trigger trip point condition, if input value (I 0 x 9nnE, SI 0 x 01) is above this limit.
0x800E 0x800F	0	0 x 12	UDINT	RW	B/S		High trip source index	Object index of high trip Point value source. Bit 16…31: Index Bit 08…15: Subindex Bit 00…07: reserved It is possible to refer to "High trip point limit" (I 0 x 800E1100 / I 0 x 800F1100) or any other available input source from another sensor (in case of combi/multi gauges).
0x800E 0x800F	0	0 x 13	REAL	RW	B/S		Percentage high trip source	Percentage of value referenced by high trip Source index (I 0 x 8nnE, SI 0 x 12) in %.
0x800E 0x800F	0	0 x 14	REAL	RW	B/S		Low trip point limit	Low limit to trigger trip point condition, if input value (I 0 x 9nnE, SI 0 x 01) is below this limit.

Index	Object code	Sub index	Data type	Access	B/S	PM	Name	Description
0x800E 0x800F	0	0 x 15	UDINT	RW	B/S		Low trip source index	Object index of low trip point value source. Bit 16…31: Index Bit 08…15: Subindex Bit 00…07: reserved It is possible to refer to "Low trip point limit" (I 0 x 800E1400/ I 0 x 800F1400) or any other available input source from another sensor (in case of combi/multi gauges).
0x800E 0x800F	0	0 x 16	REAL	RW	B/S		Percentage low trip source	Percentage of value referenced by low trip source index (I 0 x 8nnE, SI 0 x 15) in %.
0x800E 0x800F	0	0 x 17	REAL	RW	B/S		High trip hysteresis	Hysteresis value for the high trip point.
0x800E 0x800F	0	0 x 18	REAL	RW	B/S		Low trip hysteresis	Hysteresis value for the low trip point.
0x800E 0x800F	0	0 x 1A	UDINT	RW	B/S		Source index	Object index of active source of input value (I 0 x 9nnE, SI 0 x 01). Bit 16…31: Index Bit 08…15: Subindex Bit 00…07: reserved

Information data of the modules

Index	Object code	Sub Index	Data-type	Access	B/S	PM	Name	Description
0 x 9nnx	RECORD			RO			Information trip point 1/2	Trip point 1/Trip point 2 E = Trip point 1 F = Trip point 2
0 x 900E 0 x 900F	0	0 x 01	REAL	RO			Input value of trip point 1/2	Trip point input value as referenced by source Index (I 0 x 8nnE, SI 0 x 1A).

Trip point all slots combined

Index	Object code	Sub Index	Data type	Access	B/S	PM	Name	Description
0 x F641	RECORD			RO			Trip point output all	Trip point output all

Index	Object code	Sub Index	Data type	Access	B/S	PM	Name	Description
0 x F641		0 x 01	UDINT	RO		TX	Trip point output all instance	Status of trip point instances Bit 0: Status high trip (I 0x6nnE, SI 0x01) Bit 1: Status low trip (I 0x6nnE, SI 0x02) Bit 2: Status high trip (I 0x6nnF, SI 0x01) Bit 3: Status low trip (I 0x6nnF, SI 0x02) Bit 4…31: 0