



# Smartline Vacuum Transmitter EtherCAT Communication Manual



VSL5XE / VCL5XE

Version: 1.6 (only valid for VSL5XE, VCL5XE)  
Release: Juni 25, 2021  
Copyright: © 2021 Thyracont Vacuum Instruments GmbH

**Content**

<b>1</b>	<b>Communication .....</b>	<b>3</b>
1.1	Communication Types.....	3
1.2	Process Data Objects (PDOs).....	3
1.3	CANopen over EtherCAT (CoE).....	3
1.4	Data exchange with Smartline Transmitter Slaves.....	3
<b>2</b>	<b>Process Data Objects (PDOs) .....</b>	<b>4</b>
2.1	PDO List .....	4
2.2	TxPDO Content (0x1A00) – Pressure Status.....	4
2.3	TxPDO Content (0x1A01) – Status and Type .....	4
2.4	TxPDO Content (0x1A02) – Transmitter Status.....	6
2.5	TxPDO Content (0x1A03) – Syntax .....	7
2.6	RxPDO Content (0x1600) – Outputs.....	8
<b>3</b>	<b>Commands (0x300F:04).....</b>	<b>10</b>
3.1	Command List.....	10
3.2	General Commands for all Smartline Transmitter .....	11
3.2.1	0x00 (0) – Zero Command.....	11
3.2.2	0x01 (1) – Adjust High Vacuum.....	11
3.2.3	0x02 (2) – Adjust Atmospheric Pressure.....	11
3.2.4	0x03 (3) – Set Gas Correction Factors.....	11
3.3	VSL Commands.....	12
3.3.1	0x04 (4) – Adjust Relative Pressure .....	12
3.3.2	0x39 (57) – Set Sensor Switch Mode .....	12
3.4	VSR Commands .....	12
3.4.1	0x39 (57) – Set Sensor Switch Mode .....	12
3.5	VSM Commands .....	12
3.5.1	0x46 (70) – Activate Cold Cathode.....	12
3.5.2	0x47 (71) – Deactivate Cold Cathode.....	12
3.5.3	0x4D (77) – Set Sensor Switch Mode .....	12
3.6	VSH Commands .....	13
3.6.1	0x50 (80) – Activate Hot Cathode .....	13
3.6.2	0x51 (81) – Deactivate Hot Cathode.....	13
3.6.3	0x55 (85) – Activate DeGas .....	13
3.6.4	0x56 (86) – Deactivate DeGas .....	13
3.6.5	0x57 (87) – Set Sensor Switch Mode .....	13
<b>4</b>	<b>ESI File.....</b>	<b>14</b>
<b>5</b>	<b>Document History.....</b>	<b>14</b>
<b>6</b>	<b>License .....</b>	<b>14</b>

## 1 Communication

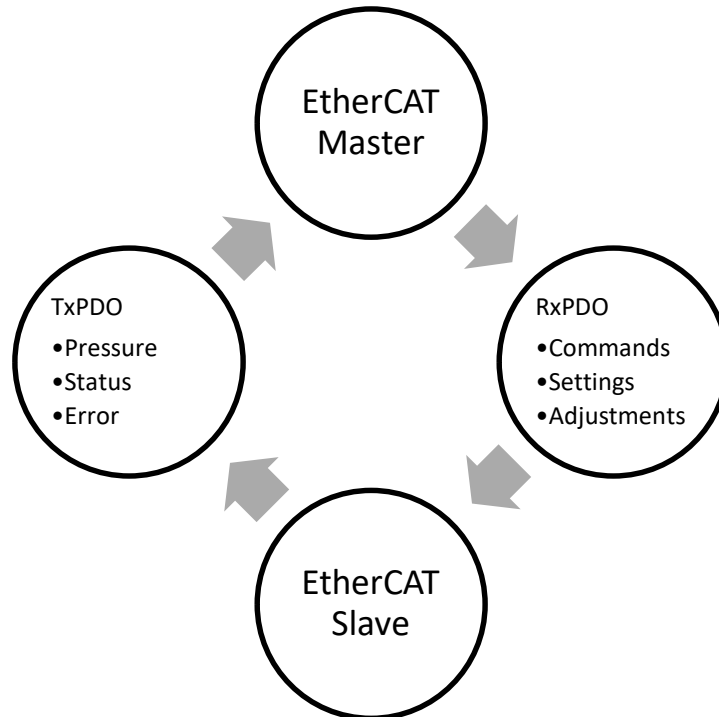
### 1.1 Communication Types

All Smartline Transmitter support the following communication type:

- Process Data Communication (PDO)

### 1.2 Process Data Objects (PDOs)

Process Data Objects (PDOs) are used to transfer data within a cyclic communication between slave and master. Reception PDOs (RxPDOs) are used to receive data and transmission PDOs (TxPDOs) to transmit data.



### 1.3 CANopen over EtherCAT (CoE)

The Object Dictionary can be accessed by a Master via acyclic SDO services or from the device description from ESI file. Both Master and Slave need to exchange data cyclically. For this reason, CoE protocol allows to configure a specific subset of the Objects defined in the Object Dictionary as Process Data. The Process Data are not a second source of information for the Slave device: they are simply a subset of the Objects provided by the Slave which are exchanged with a preferred cyclic channel and the values are copied directly from the EtherCAT frame to the local variable in the Slave's firmware and vice-versa instead of processed by the mailbox.

### 1.4 Data exchange with Smartline Transmitter Slaves

The Objects with Index 0x200F and Index 0x300F are defined as Input Data respectively Output Data. These Objects are mapped as Process Data Objects (PDOs) for cyclic data exchange.

## 2 Process Data Objects (PDOs)

### 2.1 PDO List

Index	Bitsize	Name	Flags
0x1A00	64	Pressure Status	mandatory, fixed
0x1A01	8	Status and Type	mandatory, fixed
0x1A02	8	Transmitter Status	mandatory, fixed
0x1A03	16	Syntax	mandatory, fixed
0x1600	80	Outputs	mandatory, fixed

### 2.2 TxPDO Content (0x1A00) – Pressure Status

Index	Bitsize	Name	Type
0x200F:01	32	Actual Pressure	REAL
0x200F:02	32	Relative Pressure	REAL
0x200F:03	16	Actual GCF 1	UINT
0x200F:04	16	Actual GCF 2	UINT

Subindex	Description												
0x01	Actual Pressure: Contains the actual pressure value.												
0x02	Relative Pressure: Contains the relative pressure value.												
0x03	Actual GCF 1: Contains the actual Gas Correction Factor (GCF) for Pirani sensor of all Smartline transmitters.												
	<table border="1"> <thead> <tr> <th>Type</th> <th>Data Range</th> </tr> </thead> <tbody> <tr> <td>VSL/VCL</td> <td>0x0014 – 0x0320 (20 – 800)</td> </tr> <tr> <td>VSR</td> <td>0x0014 – 0x0320 (20 – 800)</td> </tr> <tr> <td>VSP</td> <td>0x0014 – 0x0320 (20 – 800)</td> </tr> <tr> <td>VSM</td> <td>0x0014 – 0x0320 (20 – 800)</td> </tr> <tr> <td>VSH</td> <td>0x0014 – 0x0320 (20 – 800)</td> </tr> </tbody> </table>	Type	Data Range	VSL/VCL	0x0014 – 0x0320 (20 – 800)	VSR	0x0014 – 0x0320 (20 – 800)	VSP	0x0014 – 0x0320 (20 – 800)	VSM	0x0014 – 0x0320 (20 – 800)	VSH	0x0014 – 0x0320 (20 – 800)
Type	Data Range												
VSL/VCL	0x0014 – 0x0320 (20 – 800)												
VSR	0x0014 – 0x0320 (20 – 800)												
VSP	0x0014 – 0x0320 (20 – 800)												
VSM	0x0014 – 0x0320 (20 – 800)												
VSH	0x0014 – 0x0320 (20 – 800)												
0x04	Actual GCF 2: Contains the actual Gas Correction Factor (GCF) for hot or cold cathode for Smartline transmitters.												
	<table border="1"> <thead> <tr> <th>Type</th> <th>Data Range</th> </tr> </thead> <tbody> <tr> <td>VSL/VCL</td> <td>0x0000 (0), fixed</td> </tr> <tr> <td>VSR</td> <td>0x0000 (0), fixed</td> </tr> <tr> <td>VSP</td> <td>0x0000 (0), fixed</td> </tr> <tr> <td>VSM</td> <td>0x0014 – 0x0320 (20 – 800) for cold cathode</td> </tr> <tr> <td>VSH</td> <td>0x0014 – 0x0320 (20 – 800) for hot cathode</td> </tr> </tbody> </table>	Type	Data Range	VSL/VCL	0x0000 (0), fixed	VSR	0x0000 (0), fixed	VSP	0x0000 (0), fixed	VSM	0x0014 – 0x0320 (20 – 800) for cold cathode	VSH	0x0014 – 0x0320 (20 – 800) for hot cathode
Type	Data Range												
VSL/VCL	0x0000 (0), fixed												
VSR	0x0000 (0), fixed												
VSP	0x0000 (0), fixed												
VSM	0x0014 – 0x0320 (20 – 800) for cold cathode												
VSH	0x0014 – 0x0320 (20 – 800) for hot cathode												

### 2.3 TxPDO Content (0x1A01) – Status and Type

Index	Bitsize	Name	Type
0x200F:05	3	Sensor Type	BIT3
0x200F:06	1	DeGas active	BIT
0x200F:07	1	High vacuum cathode inactive	BIT
0x200F:08	1	Spare Filament	BIT
0x200F:09	2	Sensor Switch Mode	BIT2

Subindex	Description			
0x05	Sensor Type: Contains the Smartline Transmitter Type			
	Type	Data		
	VSR	0x1 (1)		
	VSP	0x2 (2)		
	VSM	0x3 (3)		
	VSH	0x4 (4)		
VSL/VCL	0x7 (7)			
0x06	Degas active: Indicates the status of DeGas.			
	Type	Data	Description	
	VSL/VCL	0x0 (0)	fixed	
	VSR			
	VSP			
	VSM			
VSH	0x0 (0)	Degas is inactive (default)		
	0x1 (1)	Degas is active		
0x07	High vacuum cathode inactive: For certain vacuum processes it may be favored to suppress the start of the hot cathode (VSH) or cold cathode (VSM) sensor, which is automatically controlled by the transducer electronics.			
	Type	Data	Description	
	VSL/VCL	0x0 (0)	fixed	
	VSR			
	VSP			
	VSM	0x0 (0)	cold cathode is active (default)	
0x1 (1)		cold cathode is inactive		
VSH	0x0 (0)	hot cathode is active (default)		
	0x1 (1)	hot cathode is inactive		
0x08	Spare Filament: VSH transmitters have two filaments. This bit indicates that the VSH transmitter has switched to the spare filament, filament 1 is depleted.			
	Type	Data	Description	
	VSL/VCL	0x0 (0)	fixed	
	VSR			
	VSP			
	VSM			
VSH	0x0 (0)	Filament 1 is active, CoE Object is FALSE		
	0x1 (1)	Filament 2 (spare Filament) is active, CoE Object is TRUE		
0x09	Sensor Switch Mode: By default the VSL/VCL, VSR, VSM and VSH transmitter performs a continuous transition between their sensors principles over a pressure range whereupon an assimilation of the sensor signals is carried out. The Sensor Switch Mode contains the actual mode.			
	Type	Data	Description	
	VSL/VCL	0x0 (0)	no transition, direct switch at 1 mbar	
		0x1 (1)	continuous transition between 5 mbar and 15 mbar (default)	
	VSR	0x0 (0)	no transition, direct switch at 1 mbar	
		0x1 (1)	continuous transition between 5 mbar and 15 mbar (default)	
	VSP	0x0 (0)	fixed	
	VSM	0x0 (0)	no transition, direct switch at 1E-3 mbar	
		0x1 (1)	continuous transition between 1E-3 mbar and 2E-3 mbar (default)	
	VSH	0x0 (0)	no transition, direct switch at 4E-4 mbar	
		0x1 (1)	continuous transition between 1E-3 mbar and 2E-3 mbar (default)	
		0x2 (2)	continuous transition between 2E-3 mbar and 5E-3 mbar	

## 2.4 TxPDO Content (0x1A02) – Transmitter Status

Index	Bitsize	Name	Type
0x200F:0A	1	Warning – Overrange	BIT
0x200F:0B	1	Warning – Underrange	BIT
-	1	-	Padding Bit
0x200F:0D	1	Error – Filament 1 defect	BIT
0x200F:0E	1	Error – Filament 2 defect	BIT
0x200F:0F	1	Error – Internal Communication	BIT
0x200F:10	1	Error – EEPROM failure	BIT
0x200F:11	1	Error – Sensor defect/stacked out	BIT

### Subindex Description

0x0A

#### Warning – Overrange

Type	Data	Description
all	0x0 (0)	no error
	0x1 (1)	overrange detected, pressure level exceeds the measurement range

0x0B

#### Warning – Underrange

Type	Data	Description
all	0x0 (0)	no error
	0x1 (1)	underrange detected, pressure level is lower than the measurement range. The Actual Pressure (0x200F:01) will be fixed to the minimum measurement value of the transmitter.

0x0D

#### Error – Filament 1 defect

Type	Data	Description
VSL/VCL VSR VSP VSM	0x0 (0)	fixed
	0x0 (0)	no error
	0x1 (1)	Filament 1 is defect

0x0E

#### Error – Filament 2 defect

Type	Data	Description
VSL/VCL VSR VSP VSM	0x0 (0)	fixed
	0x0 (0)	no error
	0x1 (1)	Filament 2 (spare filament) is defect

0x0F

#### Error – Internal Communication

Type	Data	Description
all	0x0 (0)	no error
	0x1 (1)	internal communication error of the transmitter electronics

0x10

#### Error – EEPROM failure

Type	Data	Description
all	0x0 (0)	no error
	0x1 (1)	failure on EEPROM

0x11

#### Error – Sensor defect/stacked out

Type	Data	Description
all	0x0 (0)	no error
	0x1 (1)	sensor head is stacked out or sensor head is defect

## 2.5 TxPDO Content (0x1A03) – Syntax

Index	Bitsize	Name	Type
-	2	-	Padding Bits
0x200F:14	1	Error – Sensor Switch Mode, Value mismatch	BIT
0x200F:15	1	Error – GCF 1, Value mismatch	BIT
0x200F:16	1	Error – GCF 2, Value mismatch	BIT
0x200F:17	1	Error – Pressure Adjust, Value mismatch	BIT
0x200F:18	1	Error – Command supported	BIT
0x200F:19	1	Error – Command invalid	BIT
0x200F:1A	8	Command executed	BYTE

Subindex	Description														
0x14	Error – Sensor Switch Mode, Value mismatch <table border="1"> <thead> <tr> <th>Type</th> <th>Data</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>VSP</td> <td>0x0 (0)</td> <td>fixed</td> </tr> <tr> <td>VSL/VCL</td> <td>0x0 (0)</td> <td>no error</td> </tr> <tr> <td>VSR VSH VSM</td> <td>0x1 (1)</td> <td>The value in Data Sensor Switch Mode (0x300F:05) is wrong or out of range</td> </tr> </tbody> </table>	Type	Data	Description	VSP	0x0 (0)	fixed	VSL/VCL	0x0 (0)	no error	VSR VSH VSM	0x1 (1)	The value in Data Sensor Switch Mode (0x300F:05) is wrong or out of range		
Type	Data	Description													
VSP	0x0 (0)	fixed													
VSL/VCL	0x0 (0)	no error													
VSR VSH VSM	0x1 (1)	The value in Data Sensor Switch Mode (0x300F:05) is wrong or out of range													
0x15	Error – GCF 1, Value mismatch <table border="1"> <thead> <tr> <th>Type</th> <th>Data</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td rowspan="2">all</td> <td>0x0 (0)</td> <td>no error</td> </tr> <tr> <td>0x1 (1)</td> <td>The value in Data GCF 1 (0x300F:02) is wrong or out of range</td> </tr> </tbody> </table>	Type	Data	Description	all	0x0 (0)	no error	0x1 (1)	The value in Data GCF 1 (0x300F:02) is wrong or out of range						
Type	Data	Description													
all	0x0 (0)	no error													
	0x1 (1)	The value in Data GCF 1 (0x300F:02) is wrong or out of range													
0x16	Error – GCF 2, Value mismatch <table border="1"> <thead> <tr> <th>Type</th> <th>Data</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td rowspan="2">VSL/VCL VSR VSP</td> <td>0x0 (0)</td> <td>fixed</td> </tr> <tr> <td>0x1 (1)</td> <td>The value in Data GCF 2 (0x300F:03) is wrong or out of range</td> </tr> <tr> <td>VSH</td> <td>0x0 (0)</td> <td>no error</td> </tr> <tr> <td>VSM</td> <td>0x1 (1)</td> <td>The value in Data GCF 2 (0x300F:03) is wrong or out of range</td> </tr> </tbody> </table>	Type	Data	Description	VSL/VCL VSR VSP	0x0 (0)	fixed	0x1 (1)	The value in Data GCF 2 (0x300F:03) is wrong or out of range	VSH	0x0 (0)	no error	VSM	0x1 (1)	The value in Data GCF 2 (0x300F:03) is wrong or out of range
Type	Data	Description													
VSL/VCL VSR VSP	0x0 (0)	fixed													
	0x1 (1)	The value in Data GCF 2 (0x300F:03) is wrong or out of range													
VSH	0x0 (0)	no error													
VSM	0x1 (1)	The value in Data GCF 2 (0x300F:03) is wrong or out of range													
0x17	Error – Pressure Adjust, Value mismatch <table border="1"> <thead> <tr> <th>Type</th> <th>Data</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td rowspan="2">all</td> <td>0x0 (0)</td> <td>no error</td> </tr> <tr> <td>0x1 (1)</td> <td>The value in Data Pressure (0x300F:01) is wrong or out of range</td> </tr> </tbody> </table>	Type	Data	Description	all	0x0 (0)	no error	0x1 (1)	The value in Data Pressure (0x300F:01) is wrong or out of range						
Type	Data	Description													
all	0x0 (0)	no error													
	0x1 (1)	The value in Data Pressure (0x300F:01) is wrong or out of range													
0x18	Error – Command Supported <table border="1"> <thead> <tr> <th>Type</th> <th>Data</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td rowspan="2">all</td> <td>0x0 (0)</td> <td>Command not supported</td> </tr> <tr> <td>0x1 (1)</td> <td>no error</td> </tr> </tbody> </table>	Type	Data	Description	all	0x0 (0)	Command not supported	0x1 (1)	no error						
Type	Data	Description													
all	0x0 (0)	Command not supported													
	0x1 (1)	no error													
0x19	Error – Command invalid <table border="1"> <thead> <tr> <th>Type</th> <th>Data</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td rowspan="2">all</td> <td>0x0 (0)</td> <td>no error</td> </tr> <tr> <td>0x1 (1)</td> <td>Command is invalid and can't be executed</td> </tr> </tbody> </table>	Type	Data	Description	all	0x0 (0)	no error	0x1 (1)	Command is invalid and can't be executed						
Type	Data	Description													
all	0x0 (0)	no error													
	0x1 (1)	Command is invalid and can't be executed													
0x1A	Command executed <table border="1"> <thead> <tr> <th>Type</th> <th>Data</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>all</td> <td></td> <td>Contains the value of the last executed command that was written in Command (0x300F:04)</td> </tr> </tbody> </table>	Type	Data	Description	all		Contains the value of the last executed command that was written in Command (0x300F:04)								
Type	Data	Description													
all		Contains the value of the last executed command that was written in Command (0x300F:04)													

## 2.6 RxPDO Content (0x1600) – Outputs

Index	Bitsize	Name	Type
0x300F:01	32	Data Pressure	REAL
0x300F:02	16	Data GCF 1	UINT
0x300F:03	16	Data GCF 2	UINT
0x300F:04	8	Command	BYTE
0x300F:05	8	Data Sensor Switch Mode	BYTE

Subindex	Description		
0x01	Data Pressure		
	Type	Data	Description
	all	Var.	Contains a Pressure value as 32bit Real
0x02	Data GCF 1		
	Type	Data	Description
	all	0x0014 – 0x0320 (20 – 800)	New value for the GCF 1, used for Pirani sensor
0x03	Data GCF 2		
	Type	Data	Description
	VSL/VCL VSR VSP		all data values will be ignored
	VSH VSM	0x0014 – 0x0320 (20 – 800)	New value for the GCF 2, used for hot cathode and cold cathode
0x04	Command		
	Type	Data	Description
	all	0x00 (0)	Zero Command
		0x01 (1)	Adjust High Vacuum
		0x02 (2)	Adjust Atmospheric Pressure
		0x03 (3)	Set Gas Correction Factors (GCF)
	VSL/VCL	0x04 (4)	Adjust Relative Pressure
		0x39 (57)	Set Sensor Switch Mode
	VSR	0x39 (57)	Set Sensor Switch Mode
	VSP	-	no special VSP commands
	VSM	0x46 (70)	Activate Cold Cathode
		0x47 (71)	Deactivate Cold Cathode
		0x4D (77)	Set Sensor Switch Mode
	VSH	0x50 (80)	Active Hot Cathode
		0x51 (81)	Deactivate Hot Cathode
		0x55 (85)	Activate DeGas
		0x56 (86)	Deactivate DeGas
		0x57 (87)	Set Sensor Switch Mode
0x05	Data Sensor Switch Mode		
	Type	Data	Description
	VSL/VCL	0x0 (0)	no transition, direct switch at 1 mbar
		0x1 (1)	continuous transition between 5 mbar and 15 mbar (default)



VSR	0x0 (0)	no transition, direct switch at 1 mbar
	0x1 (1)	continuous transition between 5 mbar and 15 mbar (default)
VSP	-	VSP has no transition
VSM	0x0 (0)	no transition, direct switch at 1E-3 mbar
	0x1 (1)	continuous transition between 1E-3 mbar and 2E-3 mbar (default)
VSH	0x0 (0)	no transition, direct switch at 4E-4 mbar
	0x1 (1)	continuous transition between 1E-3 mbar and 2E-3 mbar (default)
	0x2 (2)	continuous transition between 2E-3 mbar and 5E-3 mbar

### 3 Commands (0x300F:04)

#### 3.1 Command List

All commands are separated into two groups:

- General Commands, that are valid for all Smartline transmitter
- Commands, that are valid only for a specific transmitter

Rules for commands:

- Each command will be executed only once.
- Always the last executed command will be written into Command executed (0x200F:1A)

Type	Data	Name
All	0x00 (0)	Zero Command
	0x01 (1)	Adjust High Vacuum
	0x02 (2)	Adjust Atmospheric Pressure
	0x03 (3)	Set Gas Correction Factors (GCF)
VSL/VCL	0x04 (4)	Adjust Relative Pressure
	0x39 (57)	Set Sensor Switch Mode
VSR	0x39 (57)	Set Sensor Switch Mode
VSP	-	No special VSP commands
VSM	0x46 (70)	Activate Cold Cathode
	0x47 (71)	Deactivate Cold Cathode
	0x4D (77)	Set Sensor Switch Mode
VSH	0x50 (80)	Active Hot Cathode
	0x51 (81)	Deactivate Hot Cathode
	0x55 (85)	Activate DeGas
	0x56 (86)	Deactivate DeGas
	0x57 (87)	Set Sensor Switch Mode

## 3.2 General Commands for all Smartline Transmitter

### 3.2.1 0x00 (0) – Zero Command

Type	Chain	PDO	Name	Data	Description
all	1.	0x300F:04	Zero Command	0x00 (0)	clear 0x200F:1A

### 3.2.2 0x01 (1) – Adjust High Vacuum

Type	Chain	PDO	Name	Data	Description
all	1.	0x300F:04	Zero Command	0x00 (0)	mandatory if 0x200F:1A is 0x01 (1)
	2.	0x300F:01	Data Pressure	0x00 (0)	mandatory
	3.	0x300F:04	Command	0x01 (1)	adjust high vacuum

### 3.2.3 0x02 (2) – Adjust Atmospheric Pressure

Type	Chain	PDO	Name	Data	Description
VSL/VCL VSR	1.	0x300F:04	Zero Command	0x00 (0)	mandatory if 0x200F:1A is 0x02 (2)
	2.	0x300F:01	Data Pressure	variable	actual atmospheric pressure
	3.	0x300F:04	Command	0x02 (2)	adjust atmospheric pressure
VSP VSM VSH	1.	0x300F:04	Zero Command	0x00 (0)	mandatory if 0x200F:1A is 0x02 (2)
	2.	0x300F:01	Data Pressure	0x03E8 (1000)	1000 mbar
	3.	0x300F:04	Command	0x02 (2)	adjust atmospheric pressure

### 3.2.4 0x03 (3) – Set Gas Correction Factors

Type	Chain	PDO	Name	Data	Description
VSL/VCL VSR VSP	1.	0x300F:04	Zero Command	0x00 (0)	mandatory if 0x200F:1A is 0x03 (3)
	2.	0x300F:02	Data GCF 1 Pirani	0x0014 (20) – 0x0320 (800)	Gas Correction Factor for Pirani
	3.	0x300F:03	Data GCF 2 BA / CC	d.c.	value will be ignored
	4.	0x300F:04	Command	0x03 (3)	set GCF factors
VSH VSM	1.	0x300F:04	Zero Command	0x00 (0)	mandatory if 0x200F:1A is 0x03 (3)
	2.	0x300F:02	Data GCF 1 Pirani	0x0014 (20) – 0x0320 (800)	Gas Correction Factor for Pirani
	3.	0x300F:03	Data GCF 2 BA / CC	0x0014 (20) – 0x0320 (800)	Gas Correction Factor for Hot Cathode (BA) or Cold Cathode (CC)
	4.	0x300F:04	Command	0x03 (3)	set GCF factors

### 3.3 VSL/VCL Commands

#### 3.3.1 0x04 (4) – Adjust Relative Pressure

Chain	PDO	Name	Data	Description
1.	0x300F:04	Zero Command	0x00 (0)	mandatory if 0x200F:1A is 0x04 (4)
2.	0x300F:01	Data Pressure	d.c.	Value will be ignored
3.	0x300F:04	Command	0x04 (4)	adjust relative pressure to zero

#### 3.3.2 0x39 (57) – Set Sensor Switch Mode

Chain	PDO	Name	Data	Description
1.	0x300F:04	Zero Command	0x00 (0)	mandatory if 0x200F:1A is 0x39 (57)
2.	0x300F:05	Data Sensor Switch Mode	0x0 (0) or 0x1 (1)	
3.	0x300F:04	Command	0x39 (57)	set sensor switch mode

### 3.4 VSR Commands

#### 3.4.1 0x39 (57) – Set Sensor Switch Mode

Chain	PDO	Name	Data	Description
1.	0x300F:04	Zero Command	0x00 (0)	mandatory if 0x200F:1A is 0x39 (57)
2.	0x300F:05	Data Sensor Switch Mode	0x0 (0) or 0x1 (1)	
3.	0x300F:04	Command	0x39 (57)	set sensor switch mode

### 3.5 VSM Commands

#### 3.5.1 0x46 (70) – Activate Cold Cathode

Chain	PDO	Name	Data	Description
1.	0x300F:04	Zero Command	0x00 (0)	mandatory if 0x200F:1A is 0x46 (70)
2.	0x300F:04	Command	0x46 (70)	activate cold cathode

#### 3.5.2 0x47 (71) – Deactivate Cold Cathode

Chain	PDO	Name	Data	Description
1.	0x300F:04	Zero Command	0x00 (0)	mandatory if 0x200F:1A is 0x47 (71)
2.	0x300F:04	Command	0x47 (71)	deactivate cold cathode

#### 3.5.3 0x4D (77) – Set Sensor Switch Mode

Chain	PDO	Name	Data	Description
1.	0x300F:04	Zero Command	0x00 (0)	mandatory if 0x200F:1A is 0x4D (77)
2.	0x300F:05	Data Sensor Switch Mode	0x0 (0) or 0x1 (1)	
3.	0x300F:04	Command	0x4D (77)	set sensor switch mode

### 3.6 VSH Commands

#### 3.6.1 0x50 (80) – Activate Hot Cathode

Chain	PDO	Name	Data	Description
1.	0x300F:04	Zero Command	0x00 (0)	mandatory if 0x200F:1A is 0x50 (80)
2.	0x300F:04	Command	0x50 (80)	activate hot cathode

#### 3.6.2 0x51 (81) – Deactivate Hot Cathode

Chain	PDO	Name	Data	Description
1.	0x300F:04	Zero Command	0x00 (0)	mandatory if 0x200F:1A is 0x51 (81)
2.	0x300F:04	Command	0x51 (81)	deactivate hot cathode

#### 3.6.3 0x55 (85) – Activate DeGas

Chain	PDO	Name	Data	Description
1.	0x300F:04	Zero Command	0x00 (0)	mandatory if 0x200F:1A is 0x55 (85)
2.	0x300F:04	Command	0x55 (85)	activate DeGas

#### 3.6.4 0x56 (86) – Deactivate DeGas

Chain	PDO	Name	Data	Description
1.	0x300F:04	Zero Command	0x00 (0)	mandatory if 0x200F:1A is 0x56 (86)
2.	0x300F:04	Command	0x56 (86)	deactivate DeGas

#### 3.6.5 0x57 (87) – Set Sensor Switch Mode

Chain	PDO	Name	Data	Description
1.	0x300F:04	Zero Command	0x00 (0)	mandatory if 0x200F:1A is 0x57 (87)
2.	0x300F:05	Data Sensor Switch Mode	0x0 (0), 0x1 (1) or 0x2 (2)	
3.	0x300F:04	Command	0x57 (87)	set sensor switch mode

## 4 ESI File

You can download the ESI file and this document from the Thyracont webpage:

1. Open Thyracont webpage <https://www.thyracont-vacuum.com/>
2. Browse to Support → [Download Center](#)
3. Section “Software und Apps, protocols, drivers and other - Drivers and interface protocols”

The ZIP File contains:

1. ESI File

## 5 Document History

Date	Version	Comment	Revision Number (0x1018:13)	Software Version (0x100A)
2014-01-14	1.0	Initial Release v1.0	0x2774 (10100)	-
2014-03-17	1.1	Editorial changes	0x2774 (10100)	-
2014-05-30	1.2	Description of CoE Objects (first public release)	0x2774 (10100)	3.0e
2014-07-09	1.3	1.) Several names of parameters changed and editorial changes of their description 6000:01 → “Actual GCF 1” 6000:02 → “Actual GCF 2” 6000:07 → “Spare Filament” 6000:14 → “Error – GCF 1, value mismatch” 6000:15 → “Error – GCF 2, value mismatch” 7000:01 → “Data GCF 2” 7000:03 → “Data GCF 1”  2.) Notes on Display Bug of TwinCAT added for Sensor Type (0x6000:04) and Sensor Switch Mode (0x6000:08)	0x27D8 (10200)	3.0g
2016-02-03	1.3	Typing errors in RxPDO Content (0x1A01)		
2017-11-06	1.3	Some corrections		
2018-11-16	1.4	Some corrections		
2019-10-24	1.5	Input Object 0x6000 → 0x200F (Manufacturer Specific Area) Output Object 0x7000 → 0x300F (Manufacturer Specific Area)  Relative pressure value inserted at 0x200F:02	0x03040101 only valid for VSL5XE	3.4
2021-06-25	1.6	Add VCL	0x03040101 VSL5XE/VCL5XE	3.4

## 6 License

EtherCAT® is a registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.