CR0 SYSTEM DESCRIPION AND IODD FUNCTIONS

Foreword :

The intent of this document is to describe the structure and the operation mode of the CR0 sensor with the aim to clarify the constraints that determine the possible functions and availability of data.

The sensor has an optic composed by seven lens **9x9mm** in a linear array with a step of **10mm**. The optical window is **69mm** height; the total height of the curtain is **107mm**.

Emitter and Receiver are alternate with the following sequence: **E1**, **R1**, **E2**, **R2**, **E3**, **R3**, **E4** referring to the cable side. This allows to realize a continuous succession of **six pairs** of emitted and receiving beams: **E1-R1; E2-R1; E2-R2; E3-R2; E3-R3; E4-R3.**

In order to reduce to the minimum the scanning time, the pulses are only **four**, thus the emitter **E2** and **E3** are coupled with two receivers: the pulse emitted by **E2** is received by **R1** and **R2**, the pulse emitted by **E3** is received by **R2** and **R3**.

For these reasons the set point variables are not 12 but only 10: four emission currents and six detection thresholds.

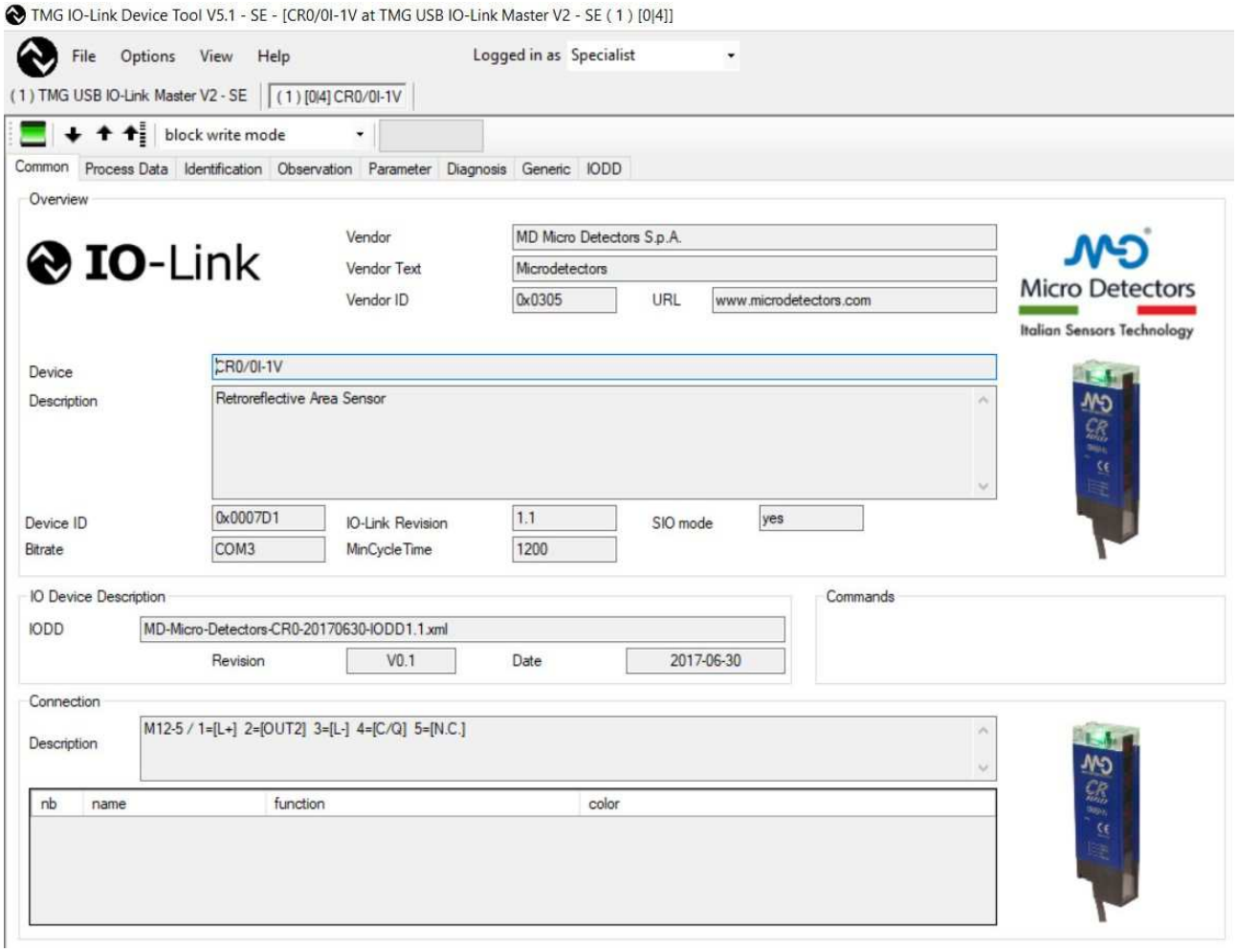
The six beams identify six different sensors each with its own optical characteristics and therefore different sensitivity, furthermore this sensor must be aimed at a reflector which, in some cases, has a smaller size of the effective projection of the individual beams. This implies that the response of the sensors could be very different.

In order to optimize the sensor performance in all conditions we provide a very large part of the dynamics of the amplifiers and the drive currents in order to equalize six different sensitivity. With a good equalization is possible to get a uniform behaviour over the entire height of the optics and a great tolerance to misalignment, but this determines certain restrictions on the availability of large signals dynamics.

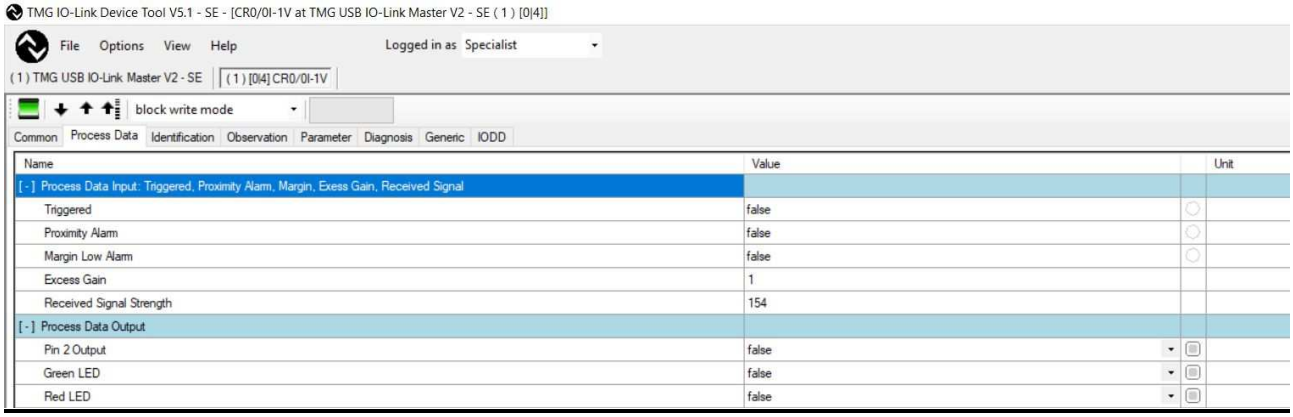
The equalization is performed at each activation of the Teach in functions.

Here we describe in details each window of the IODD page of the sensor in the IOLink communication.

[1] Common



[2] Process Data



This window displays selected data in real time. (The factory setting is displayed)

[2_1] Process Data Input, data coming from the sensor.

[2_1_1...6] The number and type of data displayed depends on the selection made in **[5_5_1] Process Data In Mode** of **[5] Parameter** window.

[2_2] Process Data Output, data sent to the sensor.

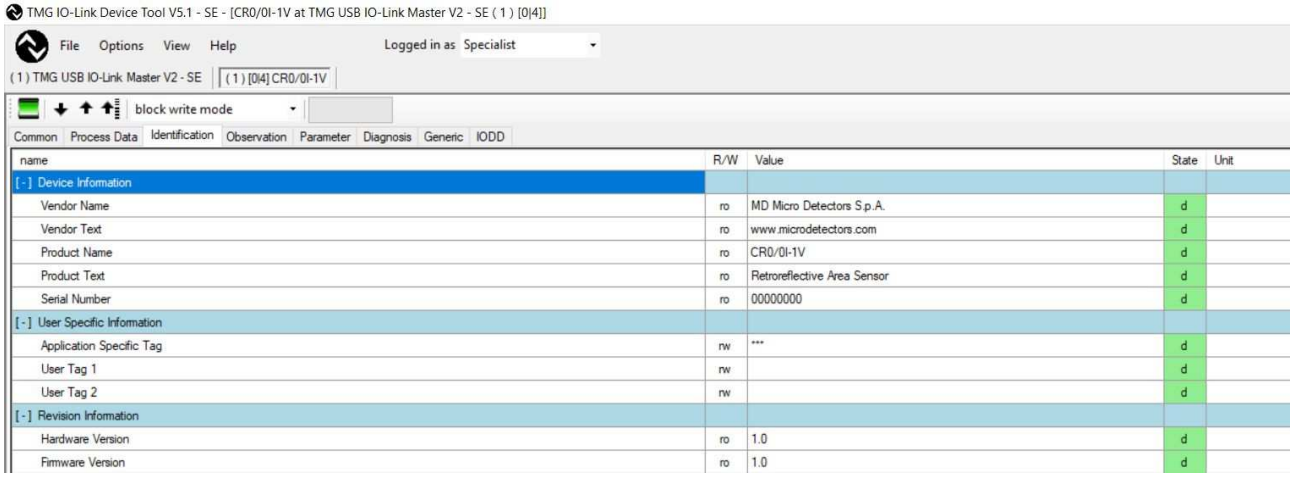
[2_2_1] Pin 2 Output, drop down menu, or toggle the figurative button.
False: Switch OFF Pin 2 output.
True: Switch ON Pin 2 output.

To activate this command the "**Independent Output PNP** or **NPN**" item must be selected in the row **[5_2_14] Pin 2 Mode** of **Operation Configuration** section in **[5] Parameter** window.

[2_2_2] Green LED, drop down menu, or toggle the figurative button.
False: Switch OFF Green LED.
True: Switch ON Green LED.

[2_2_3] Red LED, drop down menu, or toggle the figurative button.
False: Switch OFF Red LED.
True: Switch ON Red LED.

[3] Identification



name	R/W	Value	State	Unit
[-] Device Information				
Vendor Name	ro	MD Micro Detectors S.p.A.	d	
Vendor Text	ro	www.microdetectors.com	d	
Product Name	ro	CR0/0I-1V	d	
Product Text	ro	Retroreflective Area Sensor	d	
Serial Number	ro	00000000	d	
[-] User Specific Information				
Application Specific Tag	rw	***	d	
User Tag 1	rw		d	
User Tag 2	rw		d	
[-] Revision Information				
Hardware Version	ro	1.0	d	
Firmware Version	ro	1.0	d	

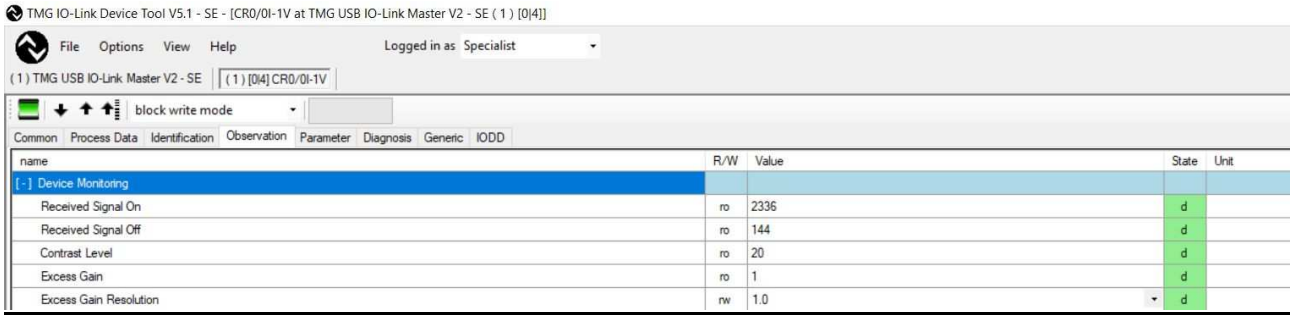
This window displays identification data.

[3_1] Device Information, data filled by the vendor to identify the specific sensor.

[3_2] User specific Information, data filled by the user to identify the specific application.

[3_3] Revision Information, data filled by the vendor to identify hardware and software versions.

[4] Observation



The factory settings are displayed.
This window displays selected data on request, click on the cell "**d**" of "**State**" column to update.

[4_1] Device Monitoring, data coming from the sensor.

[4_1_1] Received Signal On (ro);
AND Function: The calculation of the **Received Signal On** is made on the active optics only, since **they are all in Light status.**

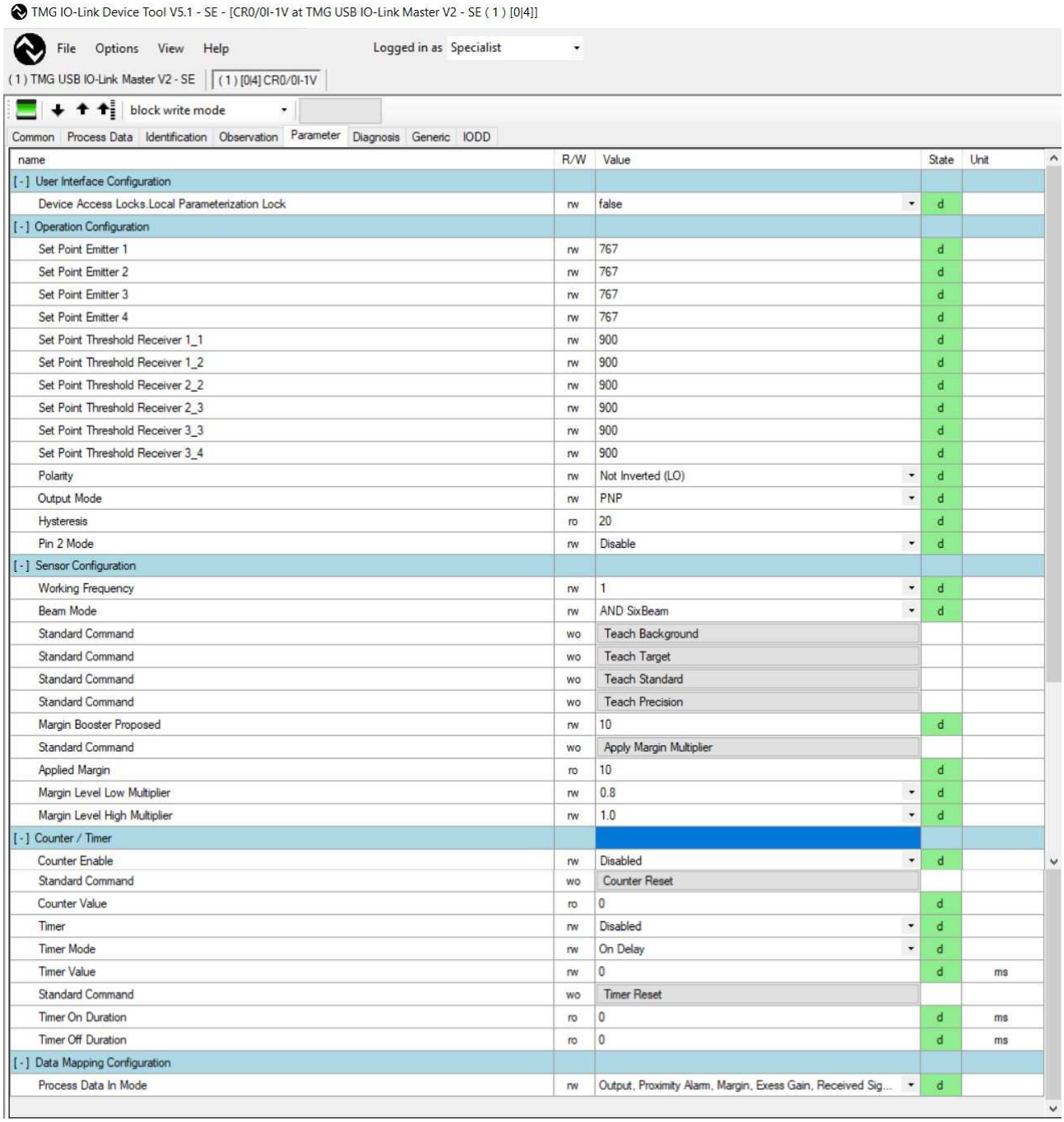
OR Function: The (average) **Received Signal On** (in Light state) calculation must be done on the active and in Light optics, since **only one in Light optics determines the Sensor Light status**.

[4_1_2] Received Signal Off (ro);
AND Function: The (average) **Received Signal Off** (in Dark state) calculation is made on the active and in Dark optics as only one in Dark optic determine the Dark State.

OR Function: The (average) **Received Signal Off** (in Dark state) calculation is made on the active and in Dark optics as only one in Dark optic determine the Dark State.

[4_1_3] Contrast Level (ro);
Ratio between taught Light signal level (on reflector) and the current Dark signal.
[4_1_4] Excess Gain (ro);
Ratio between the current Light signal and the Light threshold.
[4_1_5] Excess Gain Resolution (rw); datum sent to the sensor, drop down menu.
1: Displays the number in units, factory set condition.
0.1: Displays the number in decimals.

[5] Parameter



name	R/W	Value	State	Unit
[-] User Interface Configuration				
Device Access Locks.Local Parameterization Lock	rw	false	d	
[-] Operation Configuration				
Set Point Emitter 1	rw	767	d	
Set Point Emitter 2	rw	767	d	
Set Point Emitter 3	rw	767	d	
Set Point Emitter 4	rw	767	d	
Set Point Threshold Receiver 1_1	rw	900	d	
Set Point Threshold Receiver 1_2	rw	900	d	
Set Point Threshold Receiver 2_2	rw	900	d	
Set Point Threshold Receiver 2_3	rw	900	d	
Set Point Threshold Receiver 3_3	rw	900	d	
Set Point Threshold Receiver 3_4	rw	900	d	
Polarity	rw	Not Inverted (LO)	d	
Output Mode	rw	PNP	d	
Hysteresis	ro	20	d	
Pin 2 Mode	rw	Disable	d	
[-] Sensor Configuration				
Working Frequency	rw	1	d	
Beam Mode	rw	AND SixBeam	d	
Standard Command	wo	Teach Background		
Standard Command	wo	Teach Target		
Standard Command	wo	Teach Standard		
Standard Command	wo	Teach Precision		
Margin Booster Proposed	rw	10	d	
Standard Command	wo	Apply Margin Multiplier		
Applied Margin	ro	10	d	
Margin Level Low Multiplier	rw	0.8	d	
Margin Level High Multiplier	rw	1.0	d	
[-] Counter / Timer				
Counter Enable	rw	Disabled	d	
Standard Command	wo	Counter Reset		
Counter Value	ro	0	d	
Timer	rw	Disabled	d	
Timer Mode	rw	On Delay	d	
Timer Value	rw	0	d	ms
Standard Command	wo	Timer Reset		
Timer On Duration	ro	0	d	ms
Timer Off Duration	ro	0	d	ms
[-] Data Mapping Configuration				
Process Data In Mode	rw	Output, Proximity Alarm, Margin, Exess Gain, Received Sig...	d	

The factory setting is displayed.

[5_1] <u>User Interface Configuration</u>

***[5_1_1] Device Access Locks. Local Parameterization Lock (rw)*;** Drop down menu.
False: The Teach button is enabled, **Factory Setting**.
True: The Teach button is disabled, but if **Remote Teach Input** is selected, it remains active.

[5_2] <u>Operation Configuration</u>

[5_2_1 to 4] Set points (rw); *values to enter.*

Set Point Emitters 1, 2, 3, 4; *factory set to 767.*

Range 0 to 1023, set the emission currents.

Setting the currents to 0 does not turn off the LEDs completely because a test current remains active.

Setting the current too high or too low does not allow room for a full range temperature compensation, so even with the performance of the Teach, the value 767 is never exceeded.

[5_2_5 to 10] **Set Point Thereshold Receivers*****;*** *values to enter.*

1_1, 1_2, 2_2, 2_3, 3_3, 3_4; *factory set to 900.*

Range 0 to 4095 this is the Dark threshold, the Light threshold is calculated from the actual Hysteresis.

IT is possible to set the threshold level from 0 to 3000, higher values may not leave space for the Light threshold.

NOTE: Change **Set Points** only for special applications, the best sensor behavior is achieved only by performing the Teach.

[5_2_11] Polarity (rw) **;** drop down menu.

Defines the behavior of the output C/Q on pin 4: LO (closed in Light), DO (closed in the Dark)

Not Inverted (LO), **Factory Setting**.

Inverted (DO).

[5_2_12] Output Mode (rw) **;** drop down menu.

Defines the type of output C/Q on pin 4.

PNP (close to plus), **Factory Setting**.

NPN (closed to minus)

[5_2_13] Hysteresis (ro); return value.

Defines the difference between Light threshold and Dark threshold expressed as percentage of Light threshold, depends on the type of Teach.

20% with Tech Standard, Factory Setting

12% with Teach Precision.

[5_2_14] Pin 2 Mode (rw)**;** drop down menu.

Defines the complex functions of Pin 2:

Disable: Pin 2 is not internally connected, **Factory Setting**.

PNP (LO): Close to plus in Light

PNP (DO): Close to plus in Dark

NPN (LO): Close to minus in Light

NPN (DO): Close to minus in Dark

Remote Teach Input: It works exactly like pressing the Teach button, if connected to the positive; this function does not exclude the button.

Independent Output PNP: Selects pin 2 output as PNP and enable Master to switch it ON / OFF selecting the state of **[2_2_1] Pin 2 Output** as **True** / **False.**

Independent Output NPN: Select pin 2 output as NPN and enable Master to switch it ON / OFF selecting the state of **[2_2_1] Pin 2 Output** as **True** / **False.**

[5_3] <u>Sensor Configuration</u>

[5_3_1] Working Fequency (rw)**;** drop down menu.

In particular applications, where it is necessary to put two curtains side by side, these could interfere with each other (the emission of one interferes with the receivers of the other). Since the period of stimulation of the emitters is about 700usec and a receiver is considered activated when it samples 2 times in a row dark or 2 times in a row light (ie waiting at least 2 scans), it could happen that one of the 2 samples is take in corrispondance to the impulse generated by the other

curtain. We therefore thought to give the possibility to set a different emission frequency in the curtains, so that the 2 consecutive readings could not be made in correspondence with the emission of 2 different curtains. Laboratory tests have been performed to determine this difference in frequency. The value of 60us has been identified as a deviation in the 2 emission periods to avoid this problem. Therefore the 2 working frequencies correspond to a period of 700usec (Working frequency 1) and to a period of 760usec (Working frequency 2). It should be noted that with a period of 760usec there is a slight drop in the response speed of the sensor.

Working Fequency = 1 : sets an emission period of 700usec

Working Fequency = 2 : sets an emission period of 760usec

***[5_3_2] Beam Mode (rw)*;** drop down menu.

Defines the number of active beams and the logic function applied to the state of these, considering the Light status as 1 and the Dark as 0.

As **AND** it allows the detection of an object, as **OR** allows the detection of a hole.

Factory Set to: **AND SixBeam.**

Optics can only be activated or deactivated consecutively, starting from the first (cable side).

If this data setting is changed, a **Factory Setting** for all other parameters is also activated, so **it is advisable to run a Teach and eventually set the parameters for the specific application again.**

[5_3_n] Teach; *for all teach commands.*

Click on the virtual button and Teach performs automatically in 1 or 2 phases, if on the activation phase the pointing quality is enough, since all signals are in an acceptable levels range to be equalized, the system set the detection parameters for the requested Teach mode and goes to the second phase or in Run mode.

If in the activation phase the pointing quality is not enough, the system goes in alignment mode, waits 120s to tests the good alignment and to repeat of the same Teach mode function.

If the 120s expires, the system re-activates the previous set point.

In Teach in process the four LED currents En are adjusted individually (E1 with R1, E2 with R1 and R2, E3 with R2 and R3, E4 with R3) so that the signal on the corresponding receivers, or one of the two corresponding receivers has reached a level C considered as 100 %, then the absolute values of the C levels of the different six pairs of beams may differ in absolute value, but the Light and Dark threshold levels are set at the same percentage of each C levels.
This results in an equalization of the sensitivity of all beams.
This function actually uses a large part of the amplifier dynamics and part of the LED output current dynamics.

At first installation, but also in general, the best way to start a Teach is to start with a non-aligned system, in order to force the function in two stages: 1) Alignment for Teach, 2) Teach.

- To do this, misalign the sensor or completely obscure the optics before starting the Teach.

- Start a Teach command: if the system is completely misaligned, the red emission LEDs flash, the red indication LED is at maximum intensity, the green indication LED is off; now adjust the alignment to minimize the red indication LED intensity and bring the green LED to the maximum intensity. If alignment is not enough, the status cell "d" becomes red "w", in this case you need to improve the alignment and repeat the command.

- Fix the sensor and run the same command for the second time.

[5_3_3] Teach Background (wo); *command;* see also ***[5_3_n] Teach.***

Teach on reflector, the optical path must be free.

If alignment is sufficient, this command adjust the currents to get the maximum signal received from the reflector.

[5_3_4] Teach Target (wo) ; *command.*

The optical path can be occupied by a completely opaque or semitransparent object.

This is the second phase and it is not necessary to run an alignment.

This command sets the Dark threshold to 1/2 of the difference between the currently read value and the one previously read in **Teach Background**, hysteresis is set to 12%.

If there is no signal change or a too little change from that seen in **Teach Background**, set the same value as the **Teach Precision** command.

[5_2_5] Teach Standard (wo) ; *command;* see also ***[5_3_n] Teach.***

Set a margin of 1.5 and a hysteresis of 20%.

[5_2_6] Teach Precision (wo); *command;* see also ***[5_3_n] Teach.***

Set a margin of 1.1 and a hysteresis of 12%.

[5_2_7] Margin Booster Proposed (rw)*; value to enter.*

This variable in decimals indicates the multiplier factor that will be applied to the LEDs current value if you run the **Apply Margin Multiplier** command.

With a value of 10, the margin remains unchanged, with a value of 100, the margin will be decupled if possible.

To enable the command, you must confirm the value and send it (see Note 1).

[5_2_8] Apply Margin Multiplier (wo); *command.*

This command increases the LED currents by multiplying the present values for the Margin Booster Proposed.

If the calculated values reach the maximum value that is applicable (767), the maximum is applied.

[5_2_9] Applied Margin (ro); *return value.*

Indicates the multiplier factor that has been applied.

If you run multiple commands, a cumulative value is not indicated, but only the one applied by the last command.

If you want to have the true margin applied, you should first run a Teach and then re-execute the command with a different value.

[5_2_10] **Margin Level Low Multiplier** ***(rw);*** drop down menu.
Values can be selected from 0.5, 0.6, 0.7, 0.8; **Factory Set** to**: 0.8**.

If the signal received from the beams in Dark does not reaches a value below the indicated fraction of the Dark Threshold, this means that the detection of the Dark condition is becoming critical.

To determine an alarm condition, the condition must remain for one hundred program cycles.

In SIO Mode, the status is always indicated by the 6Hz LED flashing of the Green LED.

If "**Event on Low Margin**" is enabled, in IO-Link mode the event is indicated with a message "Maintenance required - Cleaning: Clean device" with code 0x8C40.

Note: *Currently only when the sensor in Dark this condition is calculated and is the ratio between the sum of the signals of the beams in Dark and the sum of the Dark thresholds of the same beams.*

[5_2_11] **Margin Level High Multiplier** ***(rw).***
Values can be selected from 1.0, 1.1, 1.2, 1.5, 2.0, 5.0, 10.0, 15.0; **Factory Set** to**: 1.0**

If the signal received from the beams in Light does not reach a higher value of the factor indicated than the Light Threshold, this means that the light state detection is becoming critical.

To determine an alarm condition, the condition must remain for one hundred program cycles.

This alarm condition does not cause an "Event on Low Margin".

In SIO Mode, the status is always indicated by the 6Hz LED flashing of the Green LED.

Note: *Currently only when the sensor is in Light this condition is calculated and is the ratio between the sum of the signals of the beams in Light (in this case all the active beams) and the sum of the Light thresholds of the same beams.*

[5_4] Counter / Timer

***[5_4_1] Counter Enable (rw)*;** drop down menu.

Disabled: Disable the count function. Factory set condition.
Enabled: Enables counting Light to Dark transitions.

***[5_4_2] Counter Reset (wo)*;** command.
Set the **Counter Value** to 0.

***[5_4_3] Counter Value (ro)*;** return value.
Display the reached count. Factory set to 0.

[5_4_4] Timer (rw); drop down menu.

Disabled: Disable the Timer functions. Factory set condition.

Enabled: Enables Timer functions.

[5_4_5] Timer Mode (rw); drop down menu.

ON Delay(*): Delays switching from Light to Dark state (retriggerable).

OFF Delay(*): Delays switching from Dark to Light state (retriggerable).

One Shot(*): Transition from Light to Dark State generates a Dark Pulse (not retriggerable).

(*) Not interrupted by timer reset.

Timer Duration: Stores and report the duration of the last Light and Dark state.

[5_4_6] Timer Value (rw); value to enter.

Accepts values from 0 to 50,000ms.

Defines the duration of the functions: **ON Delay; OFF Delay; One Shot.**

[5_4_7] Timer Reset (wo); command.

Set to 0 **Timer On Duration** and **Timer Off Duration**.

[5_4_8] Timer On Duration (ro); return value.

Display the duration of the last Light state (values from 0 to 4095ms)
Also displayed in the **Process Data** window if selected.

[5_4_9] Timer Off Duration (ro); return value.

Display the duration of the last Dark state (values from 0 to 4095ms)
Also displayed in the **Process Data** window if selected.

[5_5] Data Mapping Configuration

[5_5_1] Process Data In Mode (rw); drop down menu.

It defines five different ways of displaying data in the ***[2] Process Data*** window.

The analog values **(*)** that appear in the window or are used to determine alarms and represent an average of the values of the individual active beams, so they should not be interpreted as absolute, but indicative values.

The first is the factory setting.

- Triggered	Pin 4 Output State, True (ON); False (OFF)
- Proximity Alarm*	In the Light condition the ratio: signals / light thresholds, isn't over the **Margin Level High Multiplier**
- Margin Low Alarm*	In the Dark condition the ratio: signals / dark thresholds , isn't lower the **Margin Level Low Multiplier**
- Excess Gain*	Coarse ratio between the Light signals and the Light threshold
- Receiver signal strength*	Strength of the received signals

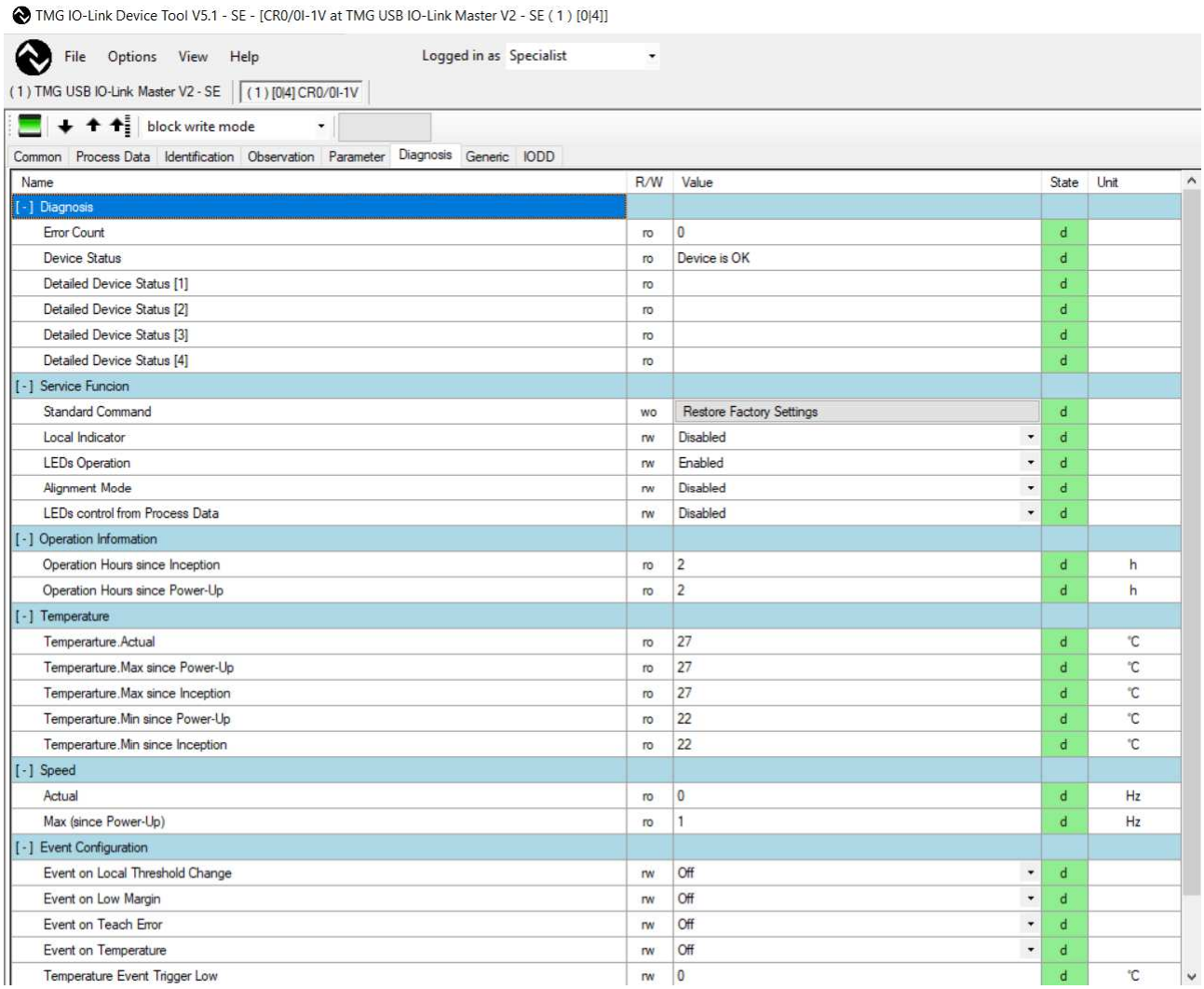
- Triggered	Pin 4 Output State, True (ON); False (OFF)
- Proximity Alarm*	In the Light condition the ratio: signals / light thresholds, isn't over the **Margin Level High Multiplier**
- Margin Low Alarm*	In the Dark condition the ratio: signals / dark thresholds , isn't lower the **Margin Level Low Multiplier**
- Excess Gain*	Coarse ratio between the Light signal and the Light threshold
- Contrast Level*	Ratio between the taught level (reflector) and the present level (a 0 means higher)
- Temperature	Current sensor internal temperature.

- Triggered	Pin 4 Output State, True (ON); False (OFF)
- Proximity Alarm*	In the Light condition the ratio: signals / light thresholds, isn't over the **Margin Level High Multiplier**
- Margin Low Alarm*	In the Dark condition the ratio: signals / dark thresholds , isn't lower the **Margin Level Low Multiplier**
- Beam Status	Status of active beams as the sum of their binary weight (B1=1...B6=32, if in Light))
- Speed	Number of switches per second (Hz)

- Triggered	Pin 4 Output State, True (ON); False (OFF)
- Proximity Alarm*	In the Light condition the ratio: signals / light thresholds, isn't over the **Margin Level High Multiplier**
- Margin Low Alarm*	In the Dark condition the ratio: signals / dark thresholds , isn't lower the **Margin Level Low Multiplier**
- Excess Gain*	Coarse ratio between the Light signal and the Light threshold
- Counter Value	Count of the number of transitions Light / Dark

- Triggered	Pin 4 Output State, True (ON); False (OFF)
- Proximity Alarm*	In the Light condition the ratio: signals / light thresholds, isn't over the **Margin Level High Multiplier**
- Margin Low Alarm*	In the Dark condition the ratio: signals / dark thresholds , isn't lower the **Margin Level Low Multiplier**
- Off Duration	Duration of the last Dark state (**Timer Off Duration**), **Counter Enable** and **Timer** must be enabled
- On Duration	Duration of the last Light state (**Timer On Duration**), **Counter Enable** and **Timer** must be enabled

[6] Diagnosis



Name	R/W	Value	State	Unit
[-] Diagnosis				
Error Count	ro	0	d	
Device Status	ro	Device is OK	d	
Detailed Device Status [1]	ro		d	
Detailed Device Status [2]	ro		d	
Detailed Device Status [3]	ro		d	
Detailed Device Status [4]	ro		d	
[-] Service Funcion				
Standard Command	wo	Restore Factory Settings	d	
Local Indicator	rw	Disabled	d	
LEDs Operation	rw	Enabled	d	
Alignment Mode	rw	Disabled	d	
LEDs control from Process Data	rw	Disabled	d	
[-] Operation Information				
Operation Hours since Inception	ro	2	d	h
Operation Hours since Power-Up	ro	2	d	h
[-] Temperature				
Temperarture.Actual	ro	27	d	°C
Temperarture.Max since Power-Up	ro	27	d	°C
Temperarture.Max since Inception	ro	27	d	°C
Temperarture.Min since Power-Up	ro	22	d	°C
Temperarture.Min since Inception	ro	22	d	°C
[-] Speed				
Actual	ro	0	d	Hz
Max (since Power-Up)	ro	1	d	Hz
[-] Event Configuration				
Event on Local Threshold Change	rw	Off	d	
Event on Low Margin	rw	Off	d	
Event on Teach Error	rw	Off	d	
Event on Temperature	rw	Off	d	
Temperature Event Trigger Low	rw	0	d	°C

[6_1] Diagnosis

[6_1_1] Error Count (ro); return value upon request.
Shows the Total Error Counter
[6_1_2] Device Status (ro); return value upon request.
Shows the Device Status
[6_1_3] Detailed Device Status [1] (ro); return value upon request.
Shows, in circular list, the first event happened, as shown also in the generic Page

[6_1_4] Detailed Device Status [2] (ro); return value upon request.

Shows, in circular list, the second event happened, as shown also in the generic Page

[6_1_5] Detailed Device Status [3] (ro); return value upon request.

Shows, in circular list, the third event happened, as shown also in the generic Page

[6_1_6] Detailed Device Status [4] (ro); return value upon request.

Shows, in circular list, the fourth event happened, as shown also in the generic Page

[6_2] Service Function

[6_2_1] Standard Command (wo); Command, **Restore Factory Setting**

Parameter and Diagnosis windows are affected by the **Factory Setting**.

In the images, the parameters are shown in **Factory Setting** condition.

[6_2_2] Local Indicator (wr); drop down menu.

Disabled: Not active. This is the Factory setting condition; LEDs work as specified by the LEDs Operation function [6_2_3]

Enabled: Green and Red LEDs flash in union with duration 0.5s and period 1s independently the LEDs Operation function [6_2_3]

[6_2_3] LEDs Operation (wr); drop down menu.

Enabled: Factory set condition. All LEDs function are enabled.

Disabled: LEDs Off for all condition, but active if **Local Indicator** is enabled.

[6_2_4] Alignment Mode (wr; n); drop down menu..

Disabled: Factory set condition.

The Green LED displays the IO-Link (SDCI) communication integrity flashing with a sequence of 0.9s ON and 0.1s OFF.

The red LED displays the ON / OFF status of the C / Q output (pin 4) by switching on / off.

Enabled: The green LED has a brightness proportional to the signal strength.

The red LED displays the IO-Link (SDCI) communication integrity flashing with a sequence of 0.9s ON and 0.1s OFF if the status of C/Q output (pin 4) in ON and with a sequence of 0.1s ON and 0.9s OFF if the status of C/Q output (pin 4) in OFF.

[6_2_5] LEDs control from process data (wr); drop down menu

Disabled: Factory set condition

The Green LED displays the IO-Link (SDCI) communication integrity flashing with a sequence of 0.9s ON and 0.1s OFF.

The red LED displays the ON / OFF status of the C / Q output (pin 4) by switching on / off.

Enabled: The green led operates as specified in menu **[2_2_2]** : ON if Green LED in true and OFF if Green LED in false.

The red led operates as specified in menu **[2_2_3]** : ON if Red LED in true and OFF if Red LED in false.

[6_3] Operation Information

[6_3_1] Operation Hours since Inception (ro)

Shows the Total operating hours since inception.

[6_3_2] Operation Hours since Power-Up (ro)

Shows the Total operating hours since power-up.

[6_4] Temperature

[6_4_1] Temperature Actual (ro)

Shows the actual temperature in °C.

[6_4_2] Temperature Max since Power-Up (ro)

Shows maximum temperature reached by the device since the power-up in °C.

[6_4_2] Temperature Max since Inception (ro)

Shows maximum temperature reached by the device since the inception in°C

[6_4_2] Temperature Min since Power-Up (ro)

Shows the minimum temperature reached by the device since the power-up in°C

[6_4_2] Temperature Min since Power-Up (ro)

Shows the maximum temperature reached by the device since the power-up in°C

[6_5] Speed

[6_5_1] Actual (ro)

Shows the actual frequency of the changing status of the C/Q output in Hz.

[6_5_2] Max since Power-Up (ro)

Shows the maximum frequency of the changing status of the C/Q output in Hz since the power-up.

[6_6] Event Configuration

[6_6_1] Event on Local Threshold Change (rw), drop down menu.
OFF: No event is generated if a Teach is made by pressing the local button.
ON: An event is generated if a Teach is made by pressing the local button. The event type is “parameter changed” and it is shown in the Detailed Device Status [6_2_2] and the Generic windows with these informations:

- Time of the event in hh:mm:ss:mmm format
- Event appearing (E<<) or Event Disappearing (E>>)
- Event Code
- Event Description

For example:

15:41:14.889 : Event (E <<): 0x6350 : Parameter changed : Check configuration

[6_6_2] Event on Low Margin (rw), drop down menu.
OFF: No event is generated if a Low Margin condition is detected.
ON: An event is generated if a Low Margin condition is detected. The event type is “Maintenance required - Cleaning : Clean device” and it is shown in the Detailed Device Status [6_2_2] and the Generic windows with these informations:

- Time of the event in hh:mm:ss:mmm format
- Event appearing
- Event Code
- Event Description

15:59:36.635 : Event (N): 0x8C40 : Maintenance required - Cleaning : Clean device

[6_6_3] Event on Teach Error (rw), drop down menu.
OFF: No event is generated if a Teach procedure in not successfully
ON: An event is generated if a Teach procedure in not successfully. The event description is “Teaching Error : Event occurs upon teaching error.” and it is shown in the Detailed Device Status [6_2_2] and the Generic windows with these informations:

- Time of the event in hh:mm:ss:mmm format
- Event appearing (N>>) or disappearing (N<<)
- Event Code
- Event Description

[6_6_4] Event on Temperature (rw), drop down menu.
OFF: No event is generated if a Low Temperature or High Temperature condition is detected.
ON: An event is generated if a Low Temperature or High Temperature condition is detected. The event description is “Device temperature over-run : Clear source of heat” or “Device temperature under-run : Insulate device” and it is shown in the Detailed Device Status [6_2_2] and the Generic windows with these informations:

- Time of the event in hh:mm:ss:mmm format
- Event appearing (W>>) or disappearing (W<<)
- Event Code
- Event Description

16:06:59.169 : Event (W >>): 0x4210 : Device temperature over-run : Clear source of heat
16:06:59.180 : Event (W >>): 0x4220 : Device temperature under-run : Insulate device

[6_6_5] Temperature Event Trigger Low (rw)

Set the Temperature at which the Event “Device temperature under-run” is generated.

[6_6_6] Temperature Event Trigger High (rw)

Set the Temperature at which the Event “Device temperature over-run” is generated.

[6_6_7] Event on Counter (rw)), drop down menu.
OFF: No Event is generated when the counting function (if enabled) reach the value defined by the “Event on Counter Count” at [6_6_7]
ON: An event is generated when the Counter reaches the value defined by the “Event on Counter Count” at [6_6_8]. The event description is “Simulation active : Check operational mode” and it is shown in the Generic windows with these informations:

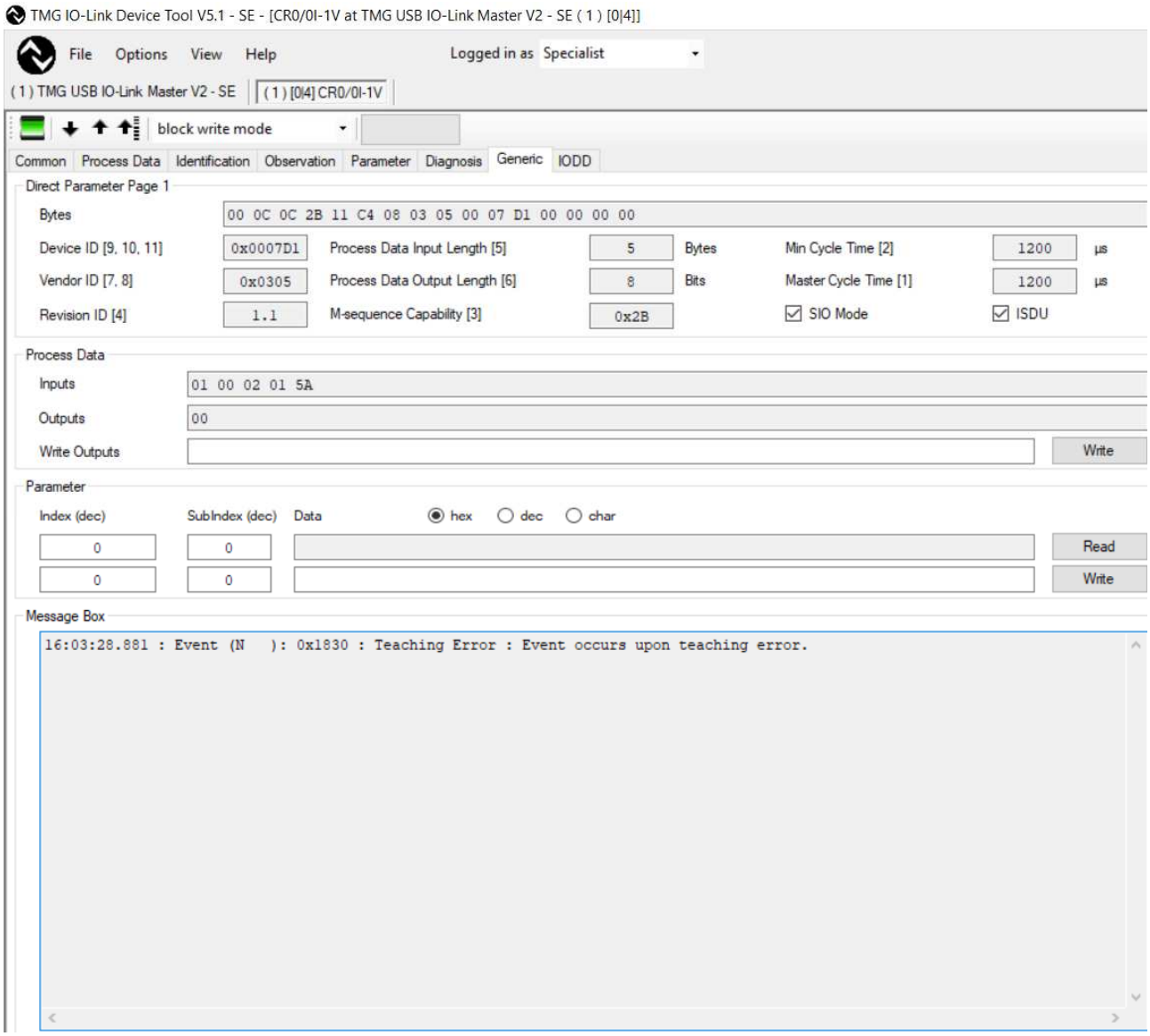
- Time of the event in hh:mm:ss:mmm format
- Event appearing (W>>) or disappearing (W<<)
- Event Code
- Event Description

16:33:01.478 : Event (W <<): 0x8C01 : Simulation active : Check operational mode

[6_6_8] Event Counter Count (rw)

Set the Counter value at which the Event “Simulation active : Check operational mode” is generated.

[7] Generic

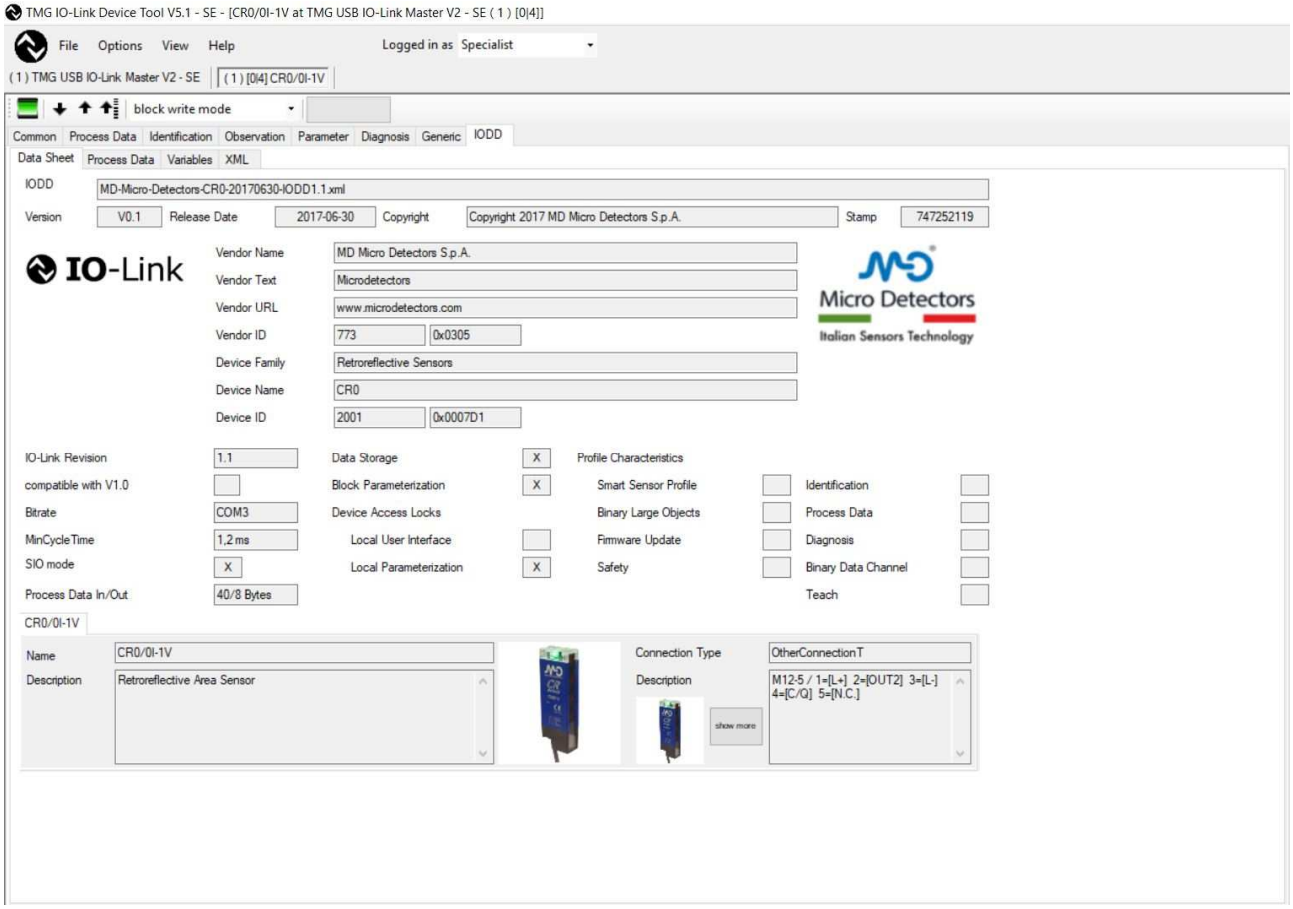


This Window shows general information of the ongoing IOLink communication.

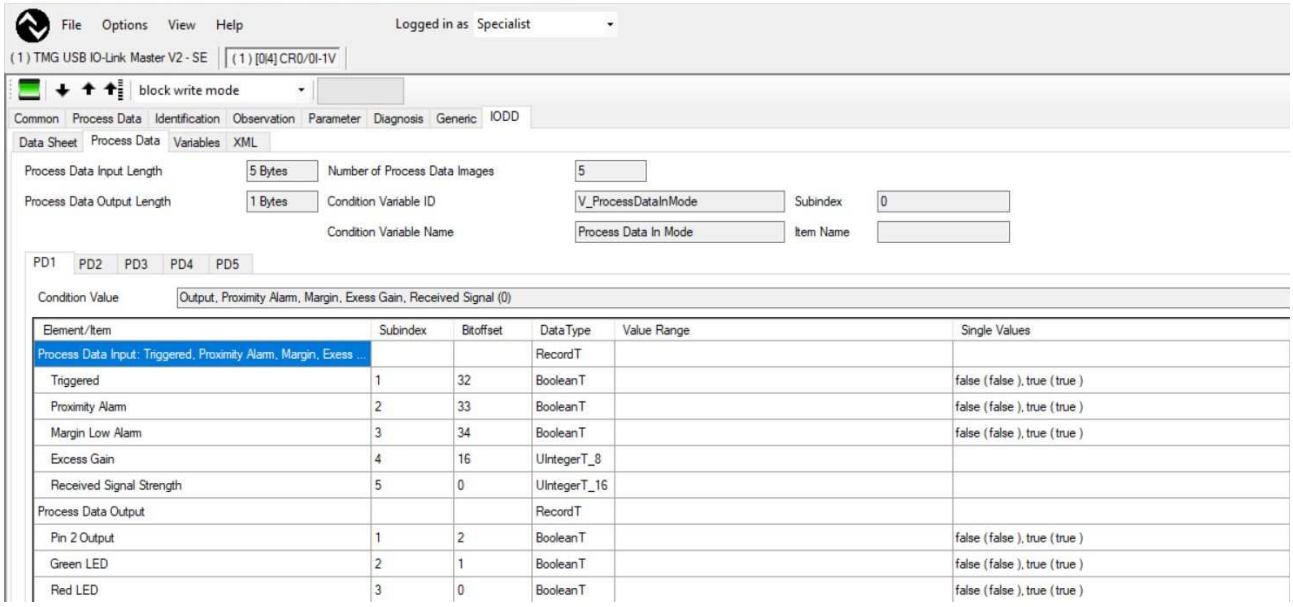
- Message Box: shows the Events occoured.
- Direct Parameter Page 1
  - In this sub-window is possible to read the parameter set for the IOLinkn communication
- Process Data
  - In this sub-window it is possible to read the process data in raw values.
- Parameter
  - With this sub-window it is possible to read or write the parameter in raw values

[8] IODD

These sub-windows represent a summary of the IODD information shown as a visual description of the variables represented by the IODD so they are intended as developer pages not useful for the operator.

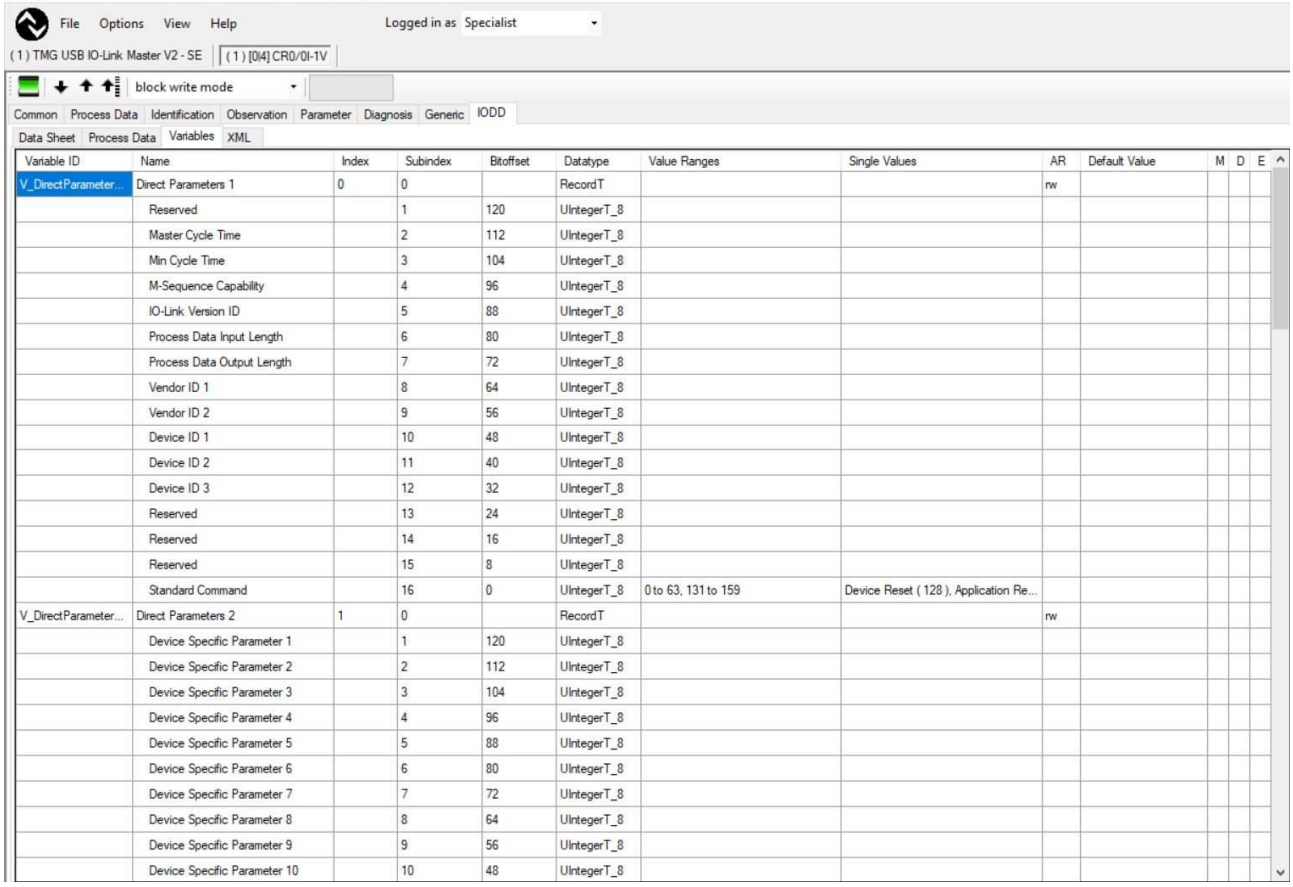


TMG IO-Link Device Tool V5.1 - SE - [CR0/0I-1V at TMG USB IO-Link Master V2 - SE (1) [0|4]]

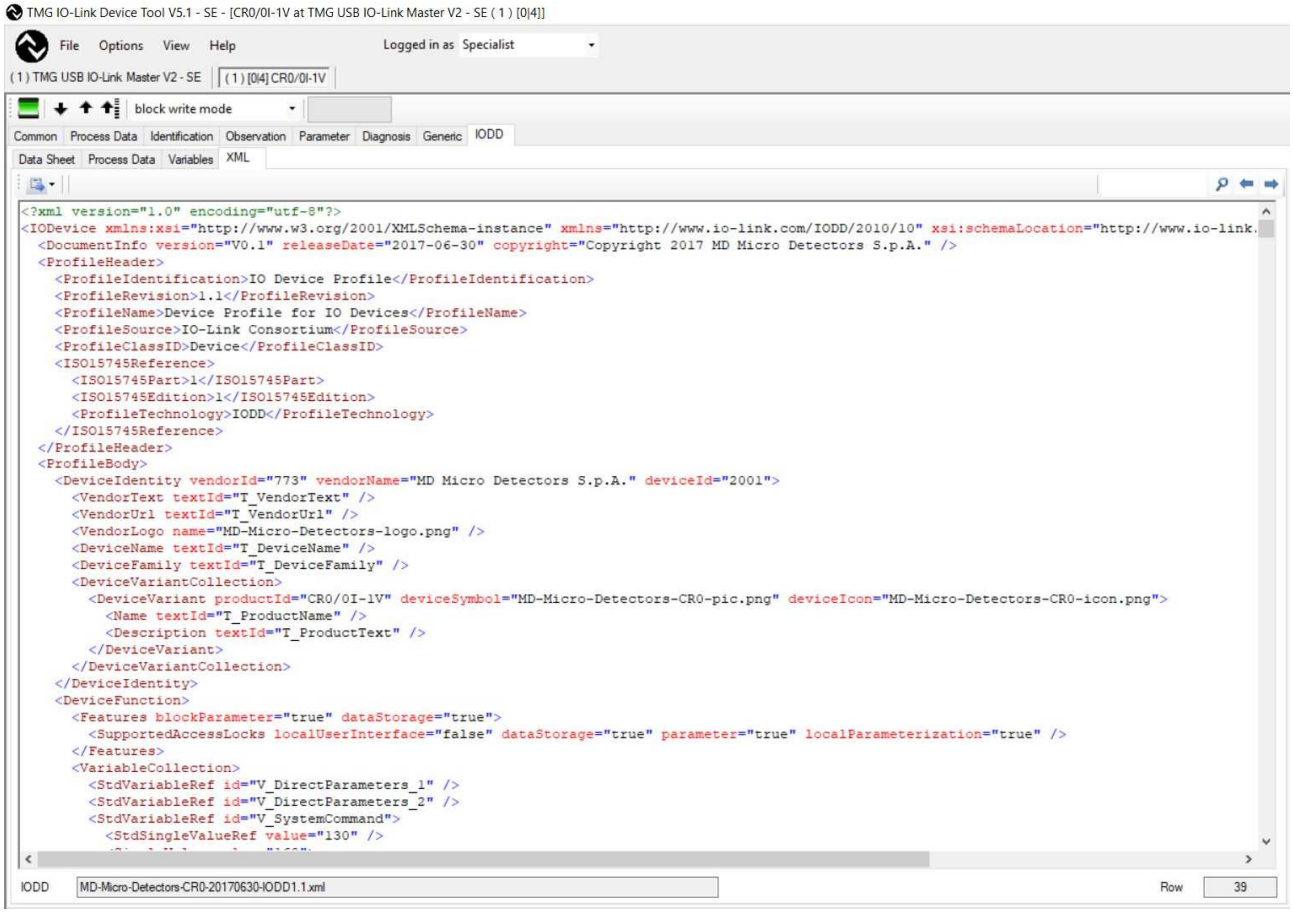


Element/Item	Subindex	Bitoffset	DataType	Value Range	Single Values
Process Data Input: Triggered, Proximity Alarm, Margin, Exess ...			RecordT		
Triggered	1	32	BooleanT		false (false), true (true)
Proximity Alarm	2	33	BooleanT		false (false), true (true)
Margin Low Alarm	3	34	BooleanT		false (false), true (true)
Excess Gain	4	16	UIntegerT_8		
Received Signal Strength	5	0	UIntegerT_16		
Process Data Output			RecordT		
Pin 2 Output	1	2	BooleanT		false (false), true (true)
Green LED	2	1	BooleanT		false (false), true (true)
Red LED	3	0	BooleanT		false (false), true (true)

TMG IO-Link Device Tool V5.1 - SE - [CR0/0I-1V at TMG USB IO-Link Master V2 - SE (1) [0|4]]



Variable ID	Name	Index	Subindex	Bitoffset	Datatype	Value Ranges	Single Values	AR	Default Value	M	D	E
V_DirectParameter...	Direct Parameters 1	0	0		RecordT			rw				
	Reserved		1	120	UIntegerT_8							
	Master Cycle Time		2	112	UIntegerT_8							
	Min Cycle Time		3	104	UIntegerT_8							
	M-Sequence Capability		4	96	UIntegerT_8							
	IO-Link Version ID		5	88	UIntegerT_8							
	Process Data Input Length		6	80	UIntegerT_8							
	Process Data Output Length		7	72	UIntegerT_8							
	Vendor ID 1		8	64	UIntegerT_8							
	Vendor ID 2		9	56	UIntegerT_8							
	Device ID 1		10	48	UIntegerT_8							
	Device ID 2		11	40	UIntegerT_8							
	Device ID 3		12	32	UIntegerT_8							
	Reserved		13	24	UIntegerT_8							
	Reserved		14	16	UIntegerT_8							
	Reserved		15	8	UIntegerT_8							
	Standard Command		16	0	UIntegerT_8	0 to 63, 131 to 159	Device Reset (128), Application Re...					
V_DirectParameter...	Direct Parameters 2	1	0		RecordT			rw				
	Device Specific Parameter 1		1	120	UIntegerT_8							
	Device Specific Parameter 2		2	112	UIntegerT_8							
	Device Specific Parameter 3		3	104	UIntegerT_8							
	Device Specific Parameter 4		4	96	UIntegerT_8							
	Device Specific Parameter 5		5	88	UIntegerT_8							
	Device Specific Parameter 6		6	80	UIntegerT_8							
	Device Specific Parameter 7		7	72	UIntegerT_8							
	Device Specific Parameter 8		8	64	UIntegerT_8							
	Device Specific Parameter 9		9	56	UIntegerT_8							
	Device Specific Parameter 10		10	48	UIntegerT_8							


TMG IO-Link Device Tool V5.1 - SE - [CR0/0I-1V at TMG USB IO-Link Master V2 - SE (1) [0|4]]
File
Options
View
Help
Logged in as
Specialist
(1) TMG USB IO-Link Master V2 - SE
(1) [0|4] CR0/0I-1V
block write mode
Common
Process Data
Identification
Observation
Parameter
Diagnosis
Generic
IODD
Data Sheet
Process Data
Variables
XML
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<ProfileRevision>1.1</ProfileRevision>
<ProfileName>Device Profile for IO Devices</ProfileName>
<ProfileSource>IO-Link Consortium</ProfileSource>
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<DeviceFamily textId="T_DeviceFamily" />
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<Description textId="T_ProductText" />
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</DeviceIdentity>
<DeviceFunction>
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</Features>
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<StdVariableRef id="V_DirectParameters_2" />
<StdVariableRef id="V_SystemCommand">
<StdSingleValueRef value="130" />
IODD
MD-Micro-Detectors-CR0-20170630-IODD1.1.xml
Row
39

Attached documents

Behavior of outputs