Quick Start Guide

To test the MAXREFDES278#, connect it to a port of an IO-Link master. In the following example, a MAXREFDES145# IO-Link master and TE-Concept IO-Link Control Tool are used. However, any IO-Link compliant master and associated IO-Link device GUI should work.

Required Equipment Supplied by Maxim

- MAXREFDES278#

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User Supplied

- IO-Link master (i.e., MAXREFDES145#) with a 24V AC-to-DC power adapter
- TE-Concept IO-Link Control Tool software
- One IO-Link cable
- Windows PC with a USB port
- 24V Solenoid or Motor

Procedure

Master Setup Procedure

- Connect the MAXREFDES278# actuator to the IO-Link master with an IO-Link M12 cable.
- Connect the IO-Link master to the PC with a USB cable.
- Download and install the latest IO-Link Control Tool software

  https://www.maximintegrated.com/content/dam/files/secured/design-tools/software/6423/maxrefdes145-tc-installer-v3.9.7136.zip

- Download the IODD file for the MAXREFDES278# from the IODD Finder website.

  https://ioddfinder.io-link.com/

- The MAXREFDES278# comes preprogrammed with firmware and the IO-Link device stack.

MAXREFDES278 Testing Procedure

1. Connect the female end of the IO-Link cable to the MAXREFDES278#.
2. Connect the male end of the IO-Link cable to one of the ports on the IO-Link master.
3. Make sure that the MAXREFDES145 is powered with 24V supply and connected to the PC through a USB cable.

4. Open the IO-Link Control Tool software as shown in **Figure 3**, and in the **FTDI USB-SPI Interfaces** area, click **refresh** button. The GUI automatically finds the IO-Link Master. Then click green **connect** button.

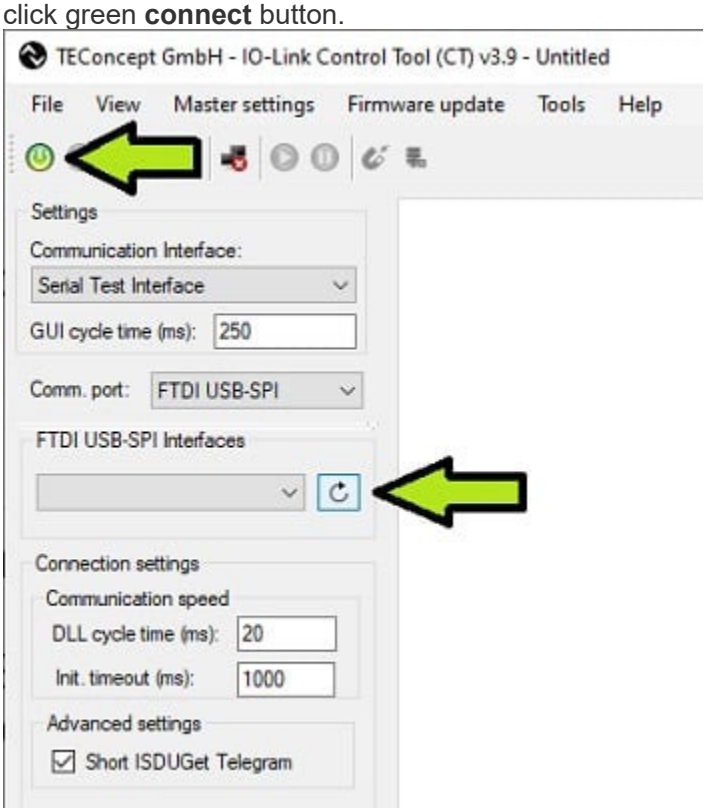
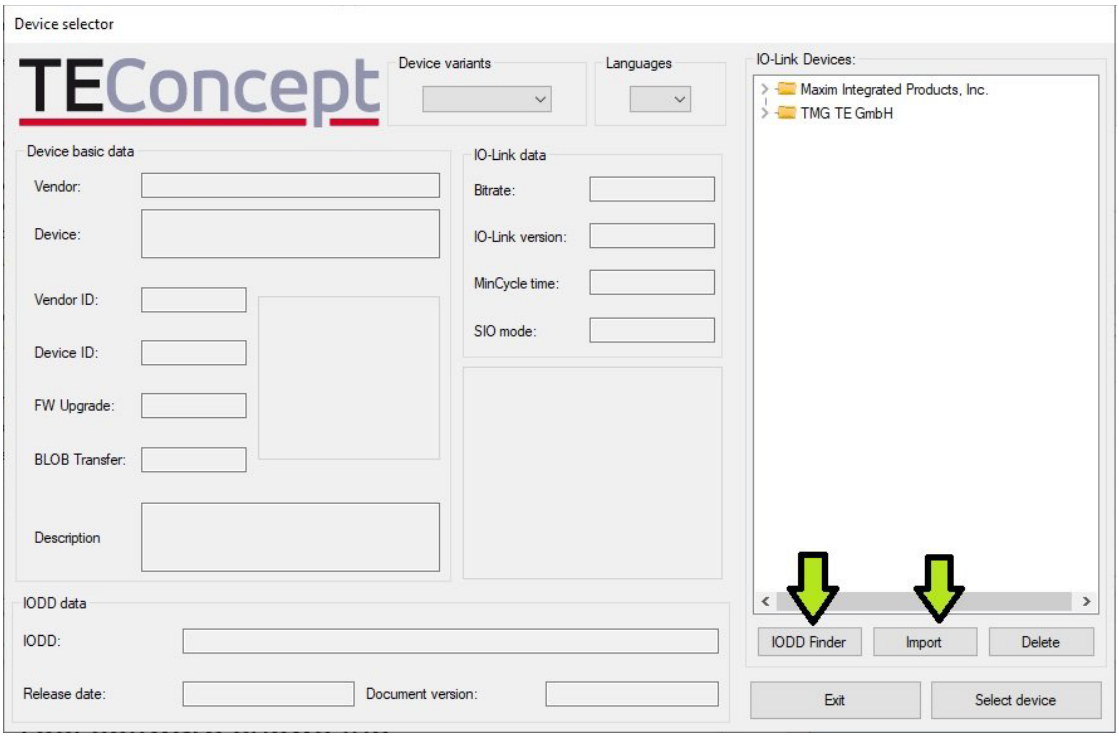
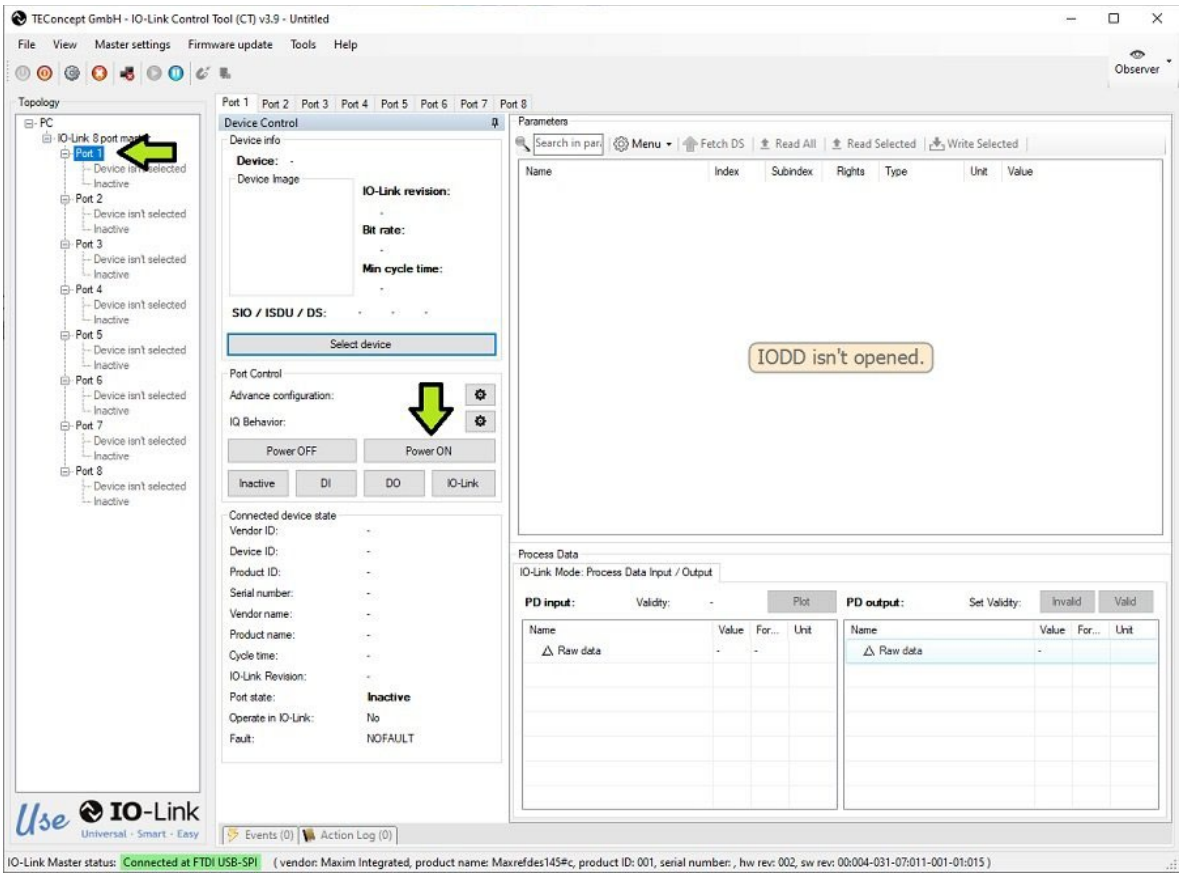


Figure 3. Connect and Refresh buttons in the IO-Link Control Tool software.

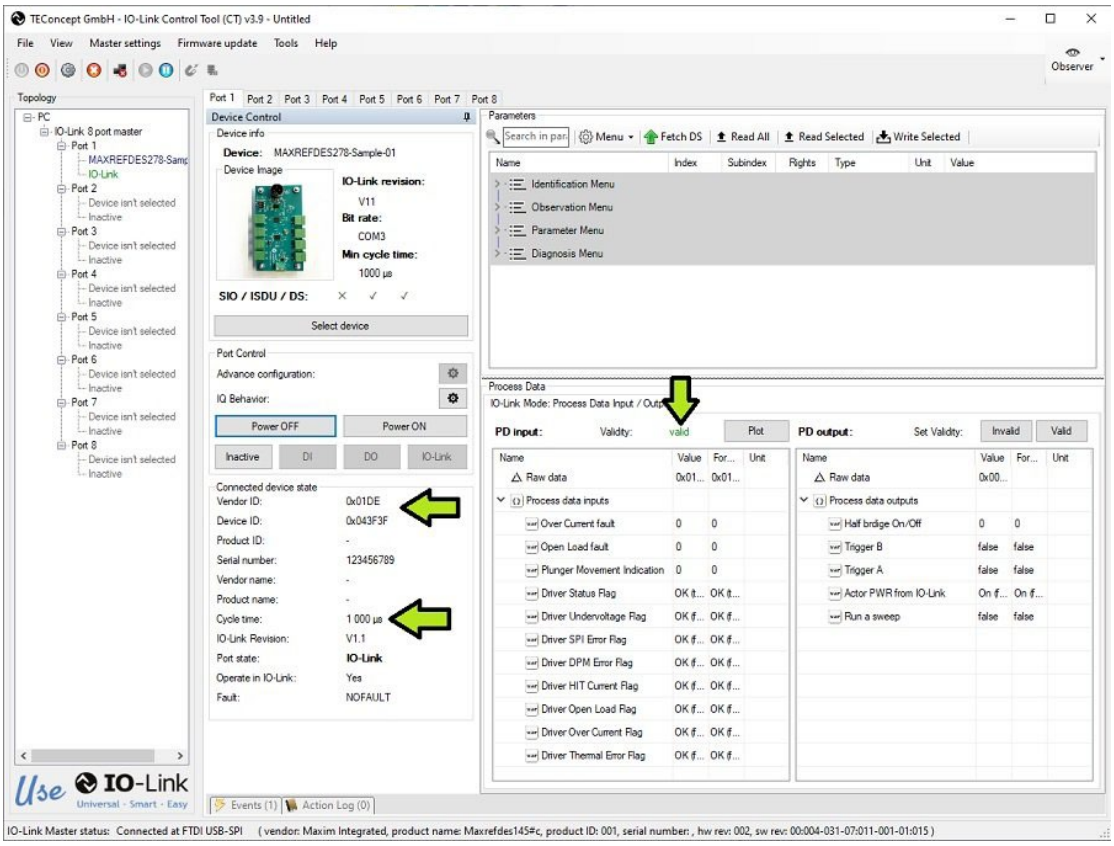
5. As shown in **Figure 4**, import the IODD file for the MAXREFDES278#. The TE-Concept GUI also allows to automatically download the **IODD file** from IODD Finder, by clicking IODD Finder in the **Select Device** menu.



6. As shown in **Figure 5**, in the **Topology** area, in the **Device Tree**, select the Port where the MAXREFDES278# is connected to.
7. Click **Power ON** button, this enables the L+ supply for the selected Port. The power-led on MAXREFDES278# as well as the red L+ LED on the selected MAXREFDES145# Port should now be on.
8. Then, click the **IO-Link** button.

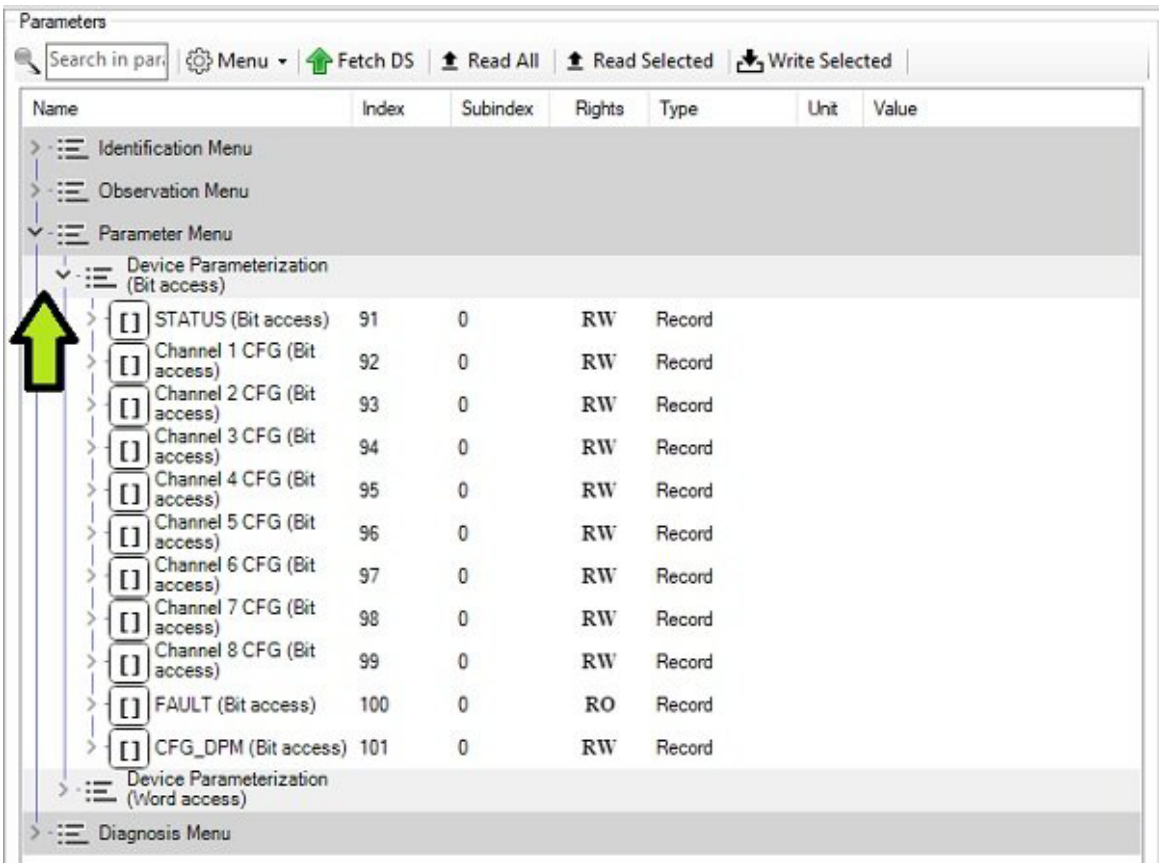


9. If communication is established correctly as shown in **Figure 6**, the IO-Link Control Tool software shows the Vendor ID, Device ID, Cycle time, as well as the Process Data input (PD input). Next to the PD input it should show Validity: valid in green. This means the Master is successfully communicating with the IO-Link Device.

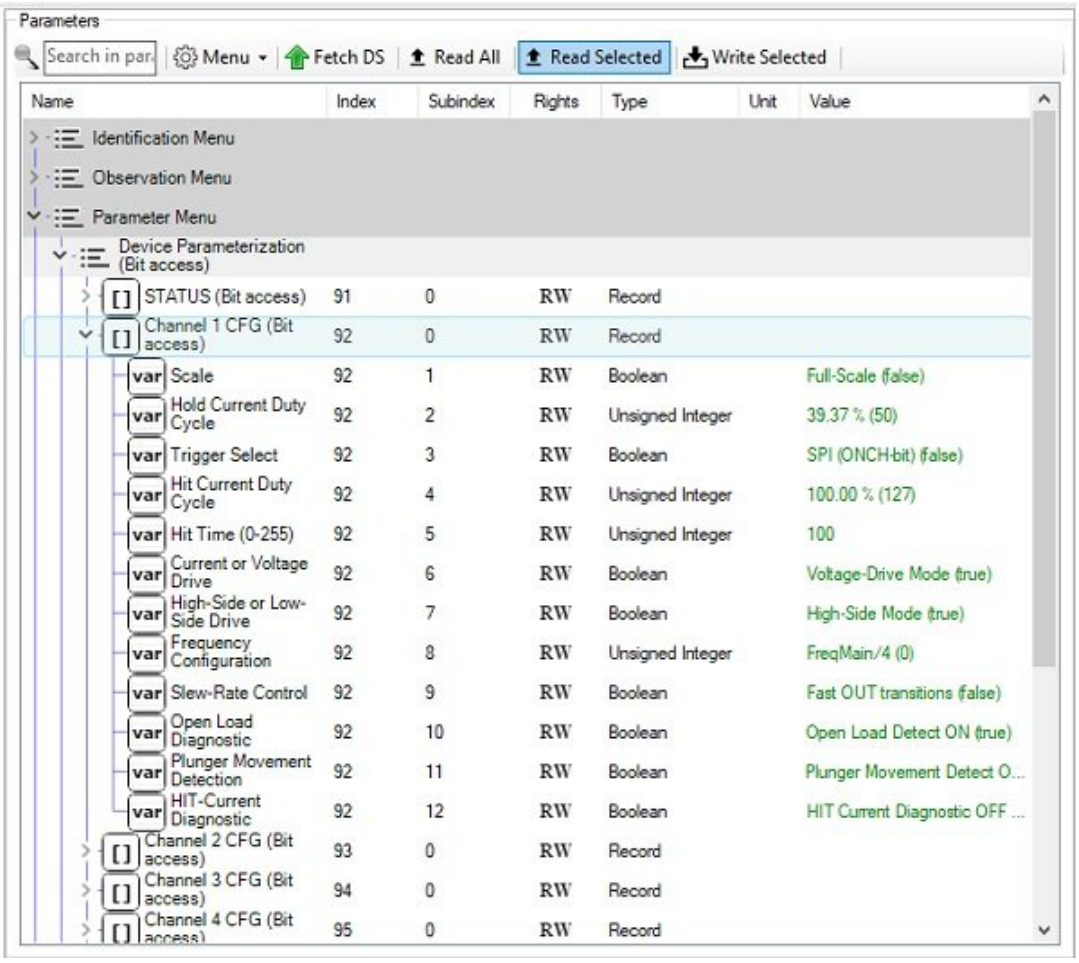


10. Observe that under Process data inputs all diagnostic shows "0" or "OK".
    1. Over Current fault is an 8-bit value, each individual bit flags the status of the appropriate channel.
    2. Overload fault is an 8-bit value, each individual bit flags the status of the appropriate channel.
    3. Plunger Movement Indication is an 8-bit value, each individual bit flags the status of the appropriate channel.
    4. Driver Status Flag shows the status of the MAX22200 octal driver.
    5. Driver Undervoltage Flag shows if the MAX22200 faces an undervoltage condition.
    6. Driver SPI Error Flag shows if the MAX22200 has SPI communication errors.
    7. Driver DPM Flag shows if there was a Plunger fault on any channel of the MAX22200.
    8. Driver HIT Flag shows if the HIT current isn't reached on any channel of the MAX22200.
    9. Driver Open Load Flag shows if there is an Open Load condition on any channel of the MAX22200.
    10. Driver Over Current Flag shows if there is an overcurrent condition on any channel of the MAX22200.
    11. Driver Thermal Error Flag shows if the MAX22200 is in thermal shutdown.

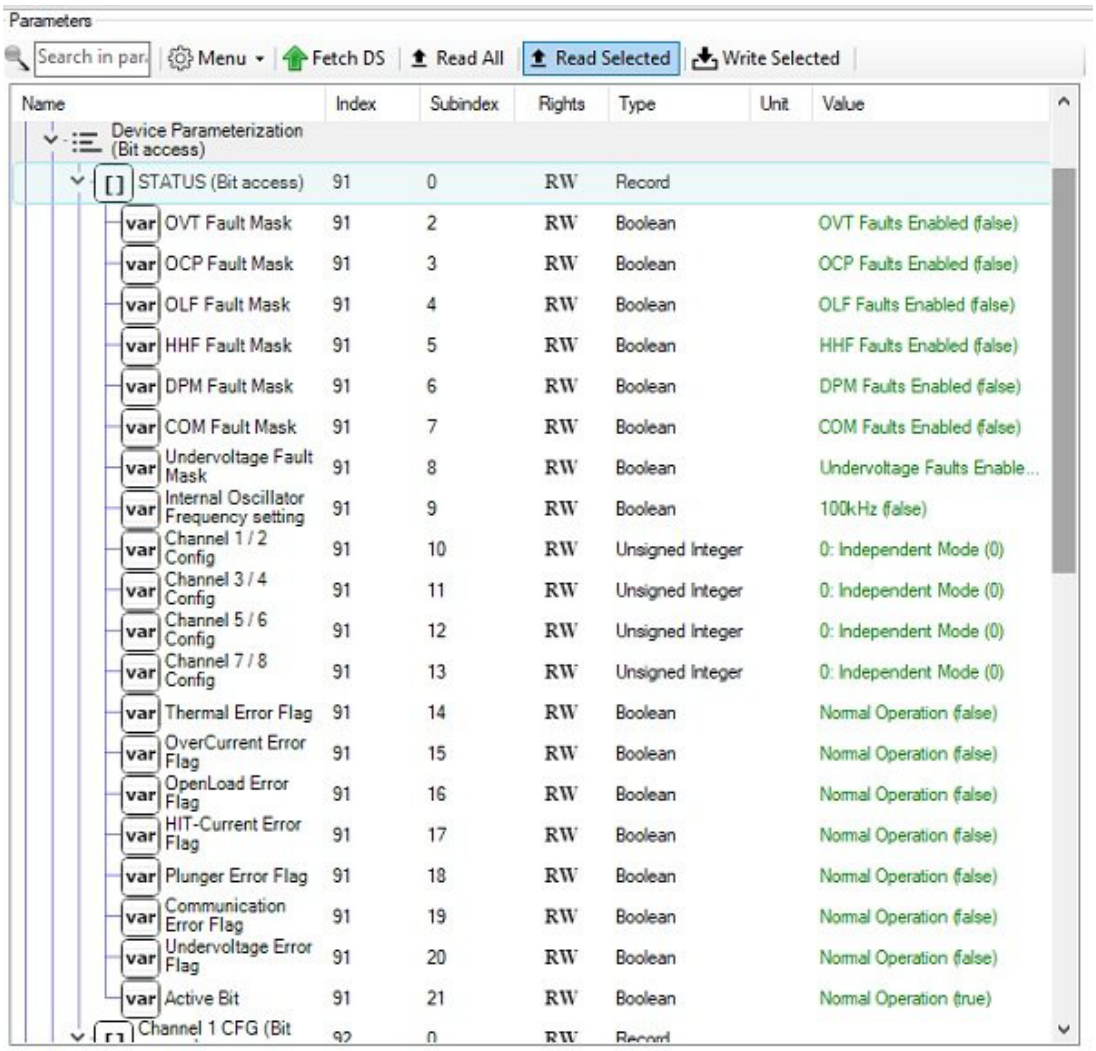
11. Details about above status information as well as adjustments can be made in the **Parameter** menu in the top right part of the Port window as shown in **Figure 7**.
12. Click little arrow to the right of the **Parameter** Menu, then click little arrow on the **Device Parameterization (Bit access)**.



13. As shown in **Figure 8**, open **Channel 1 CFG (Bit access)** menu, then click **Channel 1 CFG (Bit access)** to make sure it's highlighted. Then click **Read Selected**, this reads the current settings of Channel 1.

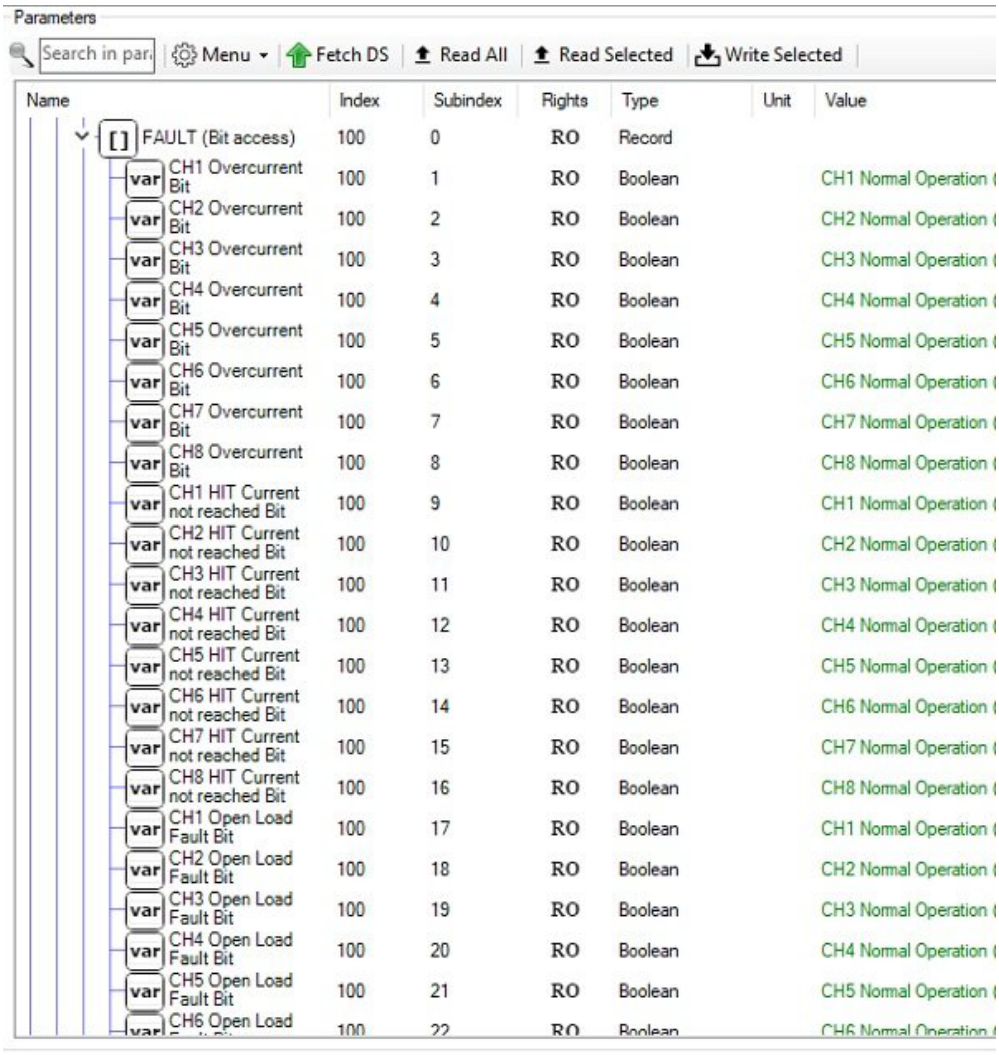


14. Select the Scale, Hit, and Hold currents in percent as well as timing parameters. For detailed information about these settings, refer to the MAX22200 datasheet. Detailed status can be read under the **STATUS (Bit access)** menu as shown in **Figure 9**.
15. For detailed Status and global Configuration of the MAX22200, refer to the **STATUS** section.



Name	Index	Subindex	Rights	Type	Unit	Value
Device Parameterization (Bit access)						
STATUS (Bit access)	91	0	RW	Record		
OVT Fault Mask	91	2	RW	Boolean		OVT Faults Enabled (false)
OCP Fault Mask	91	3	RW	Boolean		OCP Faults Enabled (false)
OLF Fault Mask	91	4	RW	Boolean		OLF Faults Enabled (false)
HHF Fault Mask	91	5	RW	Boolean		HHF Faults Enabled (false)
DPM Fault Mask	91	6	RW	Boolean		DPM Faults Enabled (false)
COM Fault Mask	91	7	RW	Boolean		COM Faults Enabled (false)
Undervoltage Fault Mask	91	8	RW	Boolean		Undervoltage Faults Enable...
Internal Oscillator Frequency setting	91	9	RW	Boolean		100kHz (false)
Channel 1 / 2 Config	91	10	RW	Unsigned Integer		0: Independent Mode (0)
Channel 3 / 4 Config	91	11	RW	Unsigned Integer		0: Independent Mode (0)
Channel 5 / 6 Config	91	12	RW	Unsigned Integer		0: Independent Mode (0)
Channel 7 / 8 Config	91	13	RW	Unsigned Integer		0: Independent Mode (0)
Thermal Error Flag	91	14	RW	Boolean		Normal Operation (false)
OverCurrent Error Flag	91	15	RW	Boolean		Normal Operation (false)
OpenLoad Error Flag	91	16	RW	Boolean		Normal Operation (false)
HIT-Current Error Flag	91	17	RW	Boolean		Normal Operation (false)
Plunger Error Flag	91	18	RW	Boolean		Normal Operation (false)
Communication Error Flag	91	19	RW	Boolean		Normal Operation (false)
Undervoltage Error Flag	91	20	RW	Boolean		Normal Operation (false)
Active Bit	91	21	RW	Boolean		Normal Operation (true)
Channel 1 CFG (Bit	92	0	RW	Record		

16. Detailed per Channel Faults can be read under the **FAULT (Bit access)** menu as shown in **Figure 10**.



Name	Index	Subindex	Rights	Type	Unit	Value
[] FAULT (Bit access)	100	0	RO	Record		
var CH1 Overcurrent Bit	100	1	RO	Boolean		CH1 Normal Operation
var CH2 Overcurrent Bit	100	2	RO	Boolean		CH2 Normal Operation
var CH3 Overcurrent Bit	100	3	RO	Boolean		CH3 Normal Operation
var CH4 Overcurrent Bit	100	4	RO	Boolean		CH4 Normal Operation
var CH5 Overcurrent Bit	100	5	RO	Boolean		CH5 Normal Operation
var CH6 Overcurrent Bit	100	6	RO	Boolean		CH6 Normal Operation
var CH7 Overcurrent Bit	100	7	RO	Boolean		CH7 Normal Operation
var CH8 Overcurrent Bit	100	8	RO	Boolean		CH8 Normal Operation
var CH1 HIT Current not reached Bit	100	9	RO	Boolean		CH1 Normal Operation
var CH2 HIT Current not reached Bit	100	10	RO	Boolean		CH2 Normal Operation
var CH3 HIT Current not reached Bit	100	11	RO	Boolean		CH3 Normal Operation
var CH4 HIT Current not reached Bit	100	12	RO	Boolean		CH4 Normal Operation
var CH5 HIT Current not reached Bit	100	13	RO	Boolean		CH5 Normal Operation
var CH6 HIT Current not reached Bit	100	14	RO	Boolean		CH6 Normal Operation
var CH7 HIT Current not reached Bit	100	15	RO	Boolean		CH7 Normal Operation
var CH8 HIT Current not reached Bit	100	16	RO	Boolean		CH8 Normal Operation
var CH1 Open Load Fault Bit	100	17	RO	Boolean		CH1 Normal Operation
var CH2 Open Load Fault Bit	100	18	RO	Boolean		CH2 Normal Operation
var CH3 Open Load Fault Bit	100	19	RO	Boolean		CH3 Normal Operation
var CH4 Open Load Fault Bit	100	20	RO	Boolean		CH4 Normal Operation
var CH5 Open Load Fault Bit	100	21	RO	Boolean		CH5 Normal Operation
var CH6 Open Load	100	22	RO	Boolean		CH6 Normal Operation

Figure 10. FAULT (Bit access) menu.

17. Individual channels can be driven by setting a bit in the Process Data output-> Half-bridge On/Off byte. Each bit drives an individual channel. Bit 0 stands for Channel 1
    1. to drive Channel 1, set Half bridge On/Off to 1.
    2. to drive Channel 2, set it to 2
    3. to drive Channel 3, set it to 4.
    4. to drive Channel 1 and 3, set it to 5.
18. Groups can also be built and then driven by the Trigger A or Trigger B bits.
    To enable this feature the Trigger Select bit must be set in the individual Channel Configuration.
19. If an external 24V supply is provided for the solenoids, the 24V supply from IO-Link can be disabled by setting the "Actor PWR from IO-Link" bit in the Process Data Output.