

TPI ADC - Helper block

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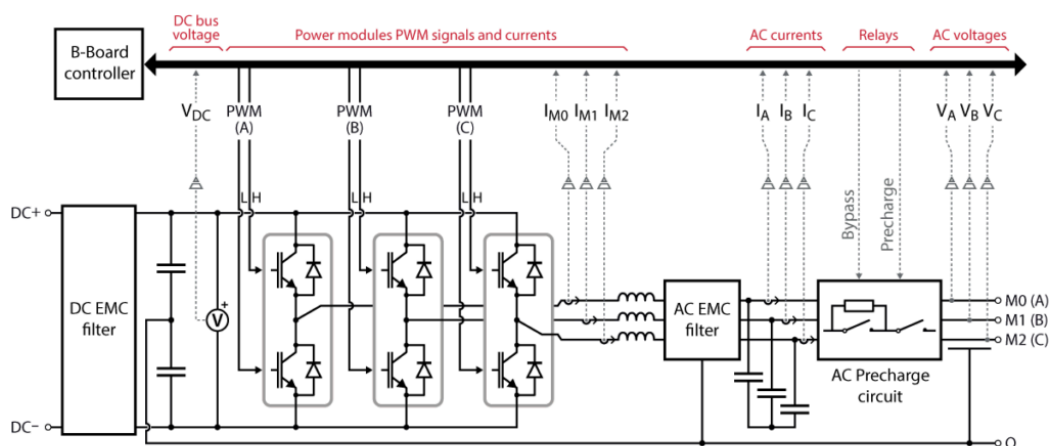
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The TPI ADC helper block is a wrapper that simplifies the use of the [ADC block](#) with the [all-in-one programmable inverter](#) (TPI8032 22kW). Since the topology of the converter is fixed, the channel assignment and the configuration of the built-in sensors are known beforehand.

The topology of the converter and the placement of the internal sensors is shown below. Additionally, the TPI features four analog inputs on its rear panel to support external sensors.



Topology of the TPI8032

Analog channel	Symbol	Description
0	Vdc	DC voltage
9	Ia	AC current – Phase A
11	Ib	AC current – Phase B
13	Ic	AC current – Phase C
8	Va	AC voltage – Phase A
10	Vb	AC voltage – Phase B
12	Vc	AC voltage – Phase C
1	IM0	Power module current – M0
2	IM1	Power module current – M1
3	IM2	Power module current – M2
4	AIN0	External sensor #0
5	AIN1	External sensor #1
6	AIN2	External sensor #2
7	AIN3	External sensor #3

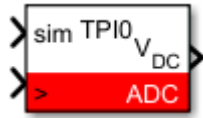
Analog channels assignment

The TPI ADC helper block is available starting from [version 2024.2](#) of the SDK. The TPI8032 is **required** to use this driver.

Simulink ADC helper block

Signal specification

- The output signal returns a single-precision floating-point value representing the measured quantity in its physical unit (e.g. Volts, Amperes).
- The `sim` input signal is used in simulation and documented in [Simulation essentials with Simulink \(PN135\)](#).
- The `>` input signal needs to be connected to the sampling clock generated by the [CONFIG block](#) to account for the exact sampling instant in simulation.



Parameters of the helper block

- **Device ID** selects which TPI to address when used in a multi-device configuration.
- **Measurement** selects which sensor to use.
- **Sensor**
 - **Sensor** gives the option to load the parameters of an imperix sensor when using an external sensor.
 - **Sensitivity [V/unit]** defines the sensitivity of the sensor. It is expressed in Volts per measured unit (e.g. V/V for a voltage sensor and V/A for a current sensor).
 - **Offset [V]** defines the offset of the sensor. It is expressed in Volts at the output of the sensor.
- **Sampling**
 - **Synchronous averaging** configures the block to output the average ADC value over 1 or 2 periods of *CLOCK_0*. See [Synchronous averaging \(PN124\)](#) for more details.
 - **Multiple samples per period (ADC history)** configures the block to output a vector of the N last values, as documented in [Oversampling \(PN154\)](#). This option is mutually exclusive with the synchronous averaging.

Block Parameters: TPI ADC

TPI ADC

Returns the value of a measurement (internal or external) taken on a TPI.

The output signal is a single-precision floating-point value representing the measured quantity in its physical unit (e.g. volts or amperes).

Addressing

Device ID (default=0)

Measurement

Sensor **Sampling**

Sensor specifications

Sensitivity (V/unit)

Offset (V)

Block Parameters: TPI ADC

TPI ADC

Returns the value of a measurement (internal or external) taken on a TPI.

The output signal is a single-precision floating-point value representing the measured quantity in its physical unit (e.g. volts or amperes).

Addressing

Device ID (default=0)

Measurement

Sensor **Sampling**

Synchronous averaging

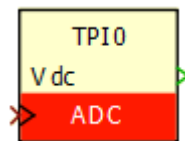
Average over

Multiple samples per period (ADC history)

PLECS ADC helper block

Signal specification

- The output signal returns a single-precision floating-point value representing the measured quantity in its physical unit (e.g. Volts, Amperes).
- The target input port (only visible at the atomic subsystem level) is used in simulation and documented in [Simulation essentials with PLECS \(PN137\)](#).
- The > input signal needs to be connected to the sampling clock generated by the [CONFIG block](#) to account for the exact sampling instant in simulation.



Parameters of the helper block

- Addressing
 - **Device ID** selects which TPI to address when used in a multi-device configuration.
 - **Measurement** selects which sensor to use.
- Sensor parameters
 - **Sensor** gives the option to load the parameters of an imperix sensor when using an external sensor.
 - **Sensitivity [V/unit]** defines the sensitivity of the sensor. It is expressed in Volts per measured unit (e.g. V/V for a voltage sensor and V/A for a current sensor).
 - **Offset [V]** defines the offset of the sensor. It is expressed in Volts at the output of the sensor.
 - **Simulate sensor(s) sensitivity(ies)**: when *true*, the ADC block expects its input to be the value of the sensor's output (typ. $\pm 10V$). When *false*, it expects the physical measure value.
- Sampling
 - **Synchronous averaging** configures the block to output the average ADC value over 1 or 2 periods of *CLOCK_0*. See [Synchronous averaging \(PN124\)](#) for more details.
 - **Multiple samples per period (ADC history)** configures the block to output a vector of the N last values, as documented in [Oversampling \(PN154\)](#). This option is mutually exclusive with the synchronous averaging.

Block Parameters: Central_PV_Inverter_v2/Controller/TPI ADC

TPI ADC - Analog input (mask) (link)

Returns the value of a measurement (internal or external) taken on a TPI.

The output signal is a single-precision floating-point value representing the measured quantity in its physical unit (e.g. volts or amperes).

Addressing Sensor parameters Sampling

Device ID [default=0]:

0

Measurement:

DC voltage (Vdc)

OK Cancel Apply Help

Block Parameters: Central_PV_Inverter_v2/Controller/TPI ADC

TPI ADC - Analog input (mask) (link)

Returns the value of a measurement (internal or external) taken on a TPI.

The output signal is a single-precision floating-point value representing the measured quantity in its physical unit (e.g. volts or amperes).

Addressing Sensor parameters Sampling

Synchronous averaging:

Enabled

Average over:

1 period of CLOCK_0

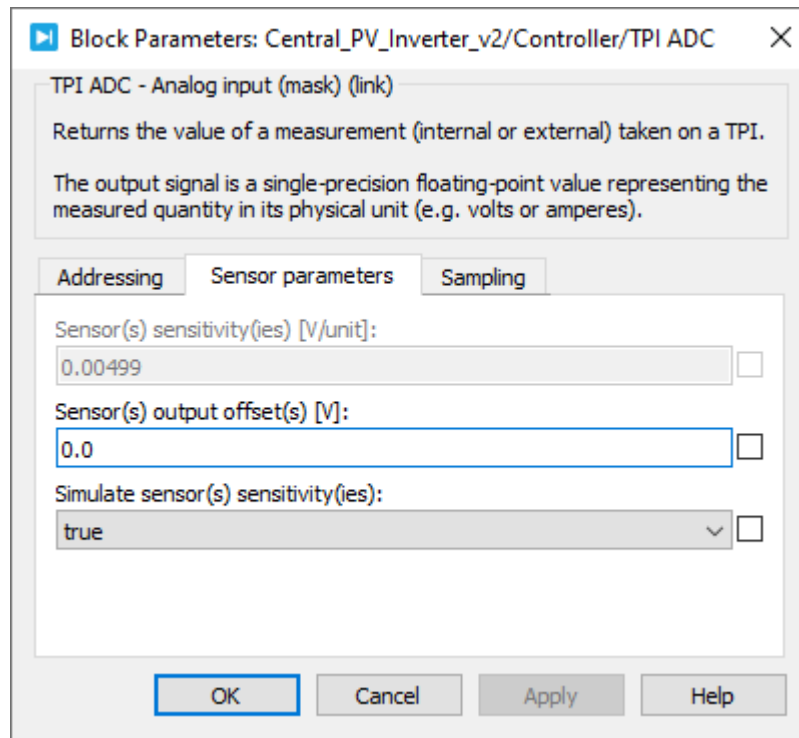
Multiple samples per period (ADC history):

Disabled

History depth [samples]:

3

OK Cancel Apply Help



C++ functions

There are no C++ helper functions for the TPI. Please refer to the [generic ADC functions](#).