



HIL101

Technical details.

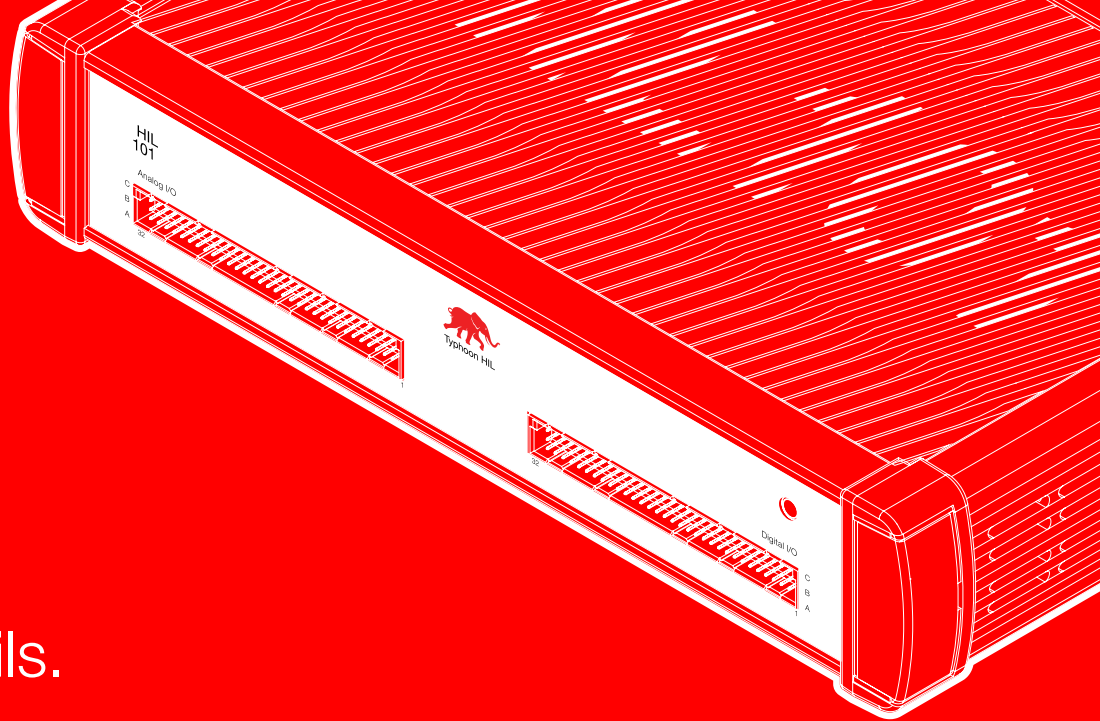
Processor	Processor	Zynq UltraScale SoC
	Custom ISE configuration support	No
Analog Inputs (AI)	Channels	16 channels
	Resolution	16-bit ADC
	Input voltage range	±10 V
	Sample rate	up to 1 MSPS
	Linearity (ENL _{RMS})	1/0
	Gain error / offset error	0.01% / 1 mV
	Input resistance	6.5 kΩ
	Protection	±24 V tolerant, ESD protection
Analog Outputs (AO)	Channels	16 channels
	Resolution	16-bit DAC
	Output voltage range	±10 V
	Sample rate	up to 4 MSPS
	Linearity (ENL _{RMS})	1/1
	Gain error / offset error	0.01% / 1 mV
	Output resistance	<10 Ω
	Current capacity	±1 mA
	Protection	±24 V tolerant, ESD protection
Analog IO connector	Connector	QW 48102, type C 96 pin main connector
User Power Supply Unit (PSU)	+5 V analog	up to 1 A, resettable protection
	+12 V analog	up to 0.5 A, resettable protection
	+3.3 V digital	up to 1 A, resettable protection
	+5 V digital	up to 1 A, resettable protection
Digital inputs (DI)	Channels	32 channels
	Input voltage range V _I	-15 V < V _I < 15 V
	Threshold voltage (low, high)	V _{I(th)low} = 0.8 V V _{I(th)high} = 2 V
	Input resistance	10 kΩ
	Protection	±24 V tolerant, ESD protection
Digital outputs (DO)	Channels	32 channels
	Output voltage range V _O	0 V < V _O < 5 V
	Threshold voltage (low, high)	V _{O(th)low} = 0.2 V V _{O(th)high} = 4.5 V
	Output resistance	400 Ω
	Protection	±24 V tolerant, ESD protection
Digital IO connector	Connector type	QW 48102, type C 96 pin main connector
Connectivity	Ethernet	2x SFP, connectors: 10/100/1000 Mbps
	USB 2.0	1x type B connector, 2.0 High speed
	CAN	2x CAN male
	RS232	2x DB9 female
	High-speed serial link	2x SFP x 5 Gb/s
	JTAG	Mobax 67502 1450
	GPIO	12 multi-purpose I/O pins, normal mode
Housing	Dimensions	250 mm x 64 mm x 198 mm
	Weight	~3.1 kg
Power supply	Input voltage	100 - 240 VAC
	Output voltage	12 V
	Power	<80 W

Find out more information in the HIL101 Hardware User Guide.
<https://tinyurl.com/4tqk4p6>

Quickly install all necessary software tools and setup your hardware components.
<https://tinyurl.com/8f8wep3>

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HIL101

Technical details.

Processor	Processor	Zync Ultrascale SoC
	Custom HIL configuration support	No
Analog inputs (AI)	Channels	16 channels
	Resolution	16 bit ADC
	Input voltage range	± 10 V
	Sample rate	up to 1 MSPS
	Linearity (DNL/INL)	1/2
	Gain error / offset error	0.01% / 1 mV
	Input resistance	6.8 k Ω
	Protection	± 24 V tolerant, ESD protection
Analog Outputs (AO)	Channels	16 channels
	Resolution	16 bit ADC
	Output voltage range	± 10 V
	Sample rate	up to 4 MSPS
	Linearity (DNL/INL)	1/1
	Gain error; offset error	0.01%; 1 mV
	Output resistance	~ 0 Ω
	Current capacity	≥ 1 mA
Protection	± 24 V tolerant, ESD protection	
Analog IO connector	Connector	DIN 41612, type C 96 pin male connector
User Power Supply Unit (PSU)	± 5 V analog	up to 1 A, resettable protection
	± 12 V analog	up to 0.5 A, resettable protection
	+3.3 V digital	up to 1 A, resettable protection
	+5 V digital	up to 1 A, resettable protection

Digital inputs (DI)	Channels	32 channels
	Input voltage range V_o	-15 V $< V_o < 15$ V
	Threshold voltages (low, high)	$V_{IL}(\text{max}) = 0.8$ V; $V_{IH}(\text{min}) = 2$ V
	Input resistance	10 k Ω
	Protection	± 24 V tolerant, ESD protection
Digital outputs (DO)	Channels	32 channels
	Output voltage range V_o	0 V $< V_o < 5$ V
	Threshold voltages (low, high)	$V_{OL}(\text{max}) = 0.2$ V; $V_{OH}(\text{min}) = 4.8$ V
	Output resistance	430 Ω
	Protection	± 24 V tolerant, ESD protection
Digital IO connector	Connector type	DIN 41612, type C 96 pin male connector
Connectivity	Ethernet	2x RJ45 connectors; 10/100/1000 Mbps
	USB2.0	1x type B connector; 2.0 high speed
	CAN	2x DB9 male
	RS232	2x DB9 female
	High speed serial link	2x SFP ≥ 5 GHz
	JTAG	Molex 87833-1420
	GPIO	12+ multi-purpose IO pins, terminal blocks
Housing	Dimensions	293 mm x 64 mm x 198 mm
	Weight	~ 2.1 kg
Power supply	Input voltage	100 - 250 VAC
	Output voltage	12 V
	Power	≤ 60 W



Find out more information in the **HIL101 Hardware User Guide**.

<https://tinyurl.com/46phb9p8>



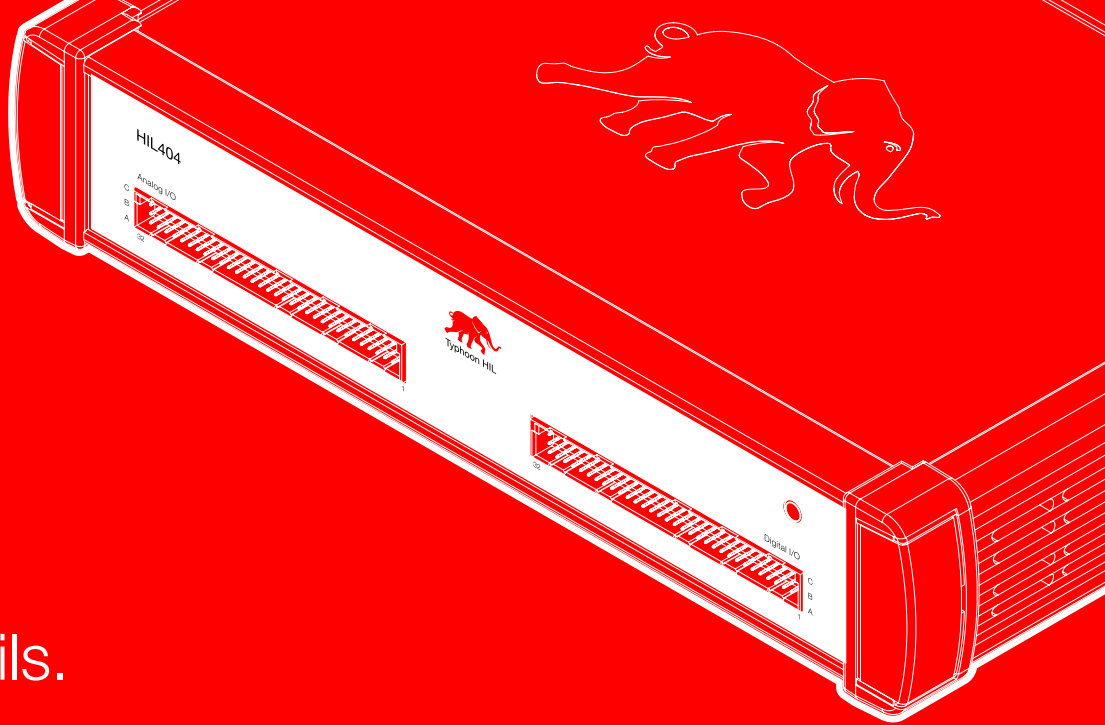
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<https://tinyurl.com/d6nxrpf3>



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HIL404

Technical details.

Processor	Processor	ZU4EG Ultrascale+ Zync SoC
	Processor configurations	up to 4 processing cores;
Analog inputs (AI)	Channels	16 channels
	Resolution	16 bit ADC
	Input voltage range	± 10 V
	Sample rate	up to 1 MSPS
	Linearity (DNL/INL)	1/2
	Gain error / offset error	0.01% / 1 mV
	Input resistance	6.8 k Ω
	Protection	± 24 V tolerant, ESD protection
Analog Outputs (AO)	Channels	16 channels
	Resolution	16 bit ADC
	Output voltage range	± 10 V
	Sample rate	up to 5 MSPS
	Linearity (DNL/INL)	1/1
	Gain error; offset error	0.01%; 1 mV
	Output resistance	0 Ω
	Current capacity	≥ 1 mA
Protection	± 24 V tolerant, ESD protection	
Analog IO connector	Connector	DIN 41612, type C 96 pin male connector
User Power Supply Unit (PSU)	± 5 V analog	up to 1 A, resettable protection
	± 12 V analog	up to 0.5 A, resettable protection
	+3.3 V digital	up to 1 A, resettable protection
	+5 V digital	up to 1 A, resettable protection

Digital inputs (DI)	Channels	32 channels
	Input voltage range V_o	-15 V $< V_o < 15$ V
	Threshold voltages (low, high)	$V_{th(max)} = 0.8$ V; $V_{th(min)} = 205$ V
	Input resistance	10 k Ω
	Protection	± 24 V tolerant, ESD protection
Digital outputs (DO)	Channels	32 channels
	Output voltage range V_o	0 V $< V_o < 5$ V
	Threshold voltages (low, high)	$V_{oh(max)} = 0.2$ V; $V_{oh(min)} = 4.8$ V
	Output resistance	430 Ω
	Protection	± 24 V tolerant, ESD protection
Digital IO connector	Connector type	DIN 41612, type C 96 pin male connector
Connectivity	Ethernet	2x RJ45 connectors; 10/100/1000 Mbps
	USB2.0	1x type B connector; 2.0 high speed
	CAN	2x DB9 male
	RS232	2x DB9 female
	High speed serial link	2x SFP ≥ 5 GHz
	JTAG	Molex 87833-1420
	GPIO	12+ multi-purpose IO pins, terminal blocks
Housing	Dimensions	293 mm x 64 mm x 198 mm
	Weight	~ 5 kg
Power supply	Input voltage	100 - 250 VAC
	Output voltage	12 V
	Power	≤ 60 W



Find out more information in the **HIL404 Hardware User Guide**.

<https://tinyurl.com/2bjs8v3r>



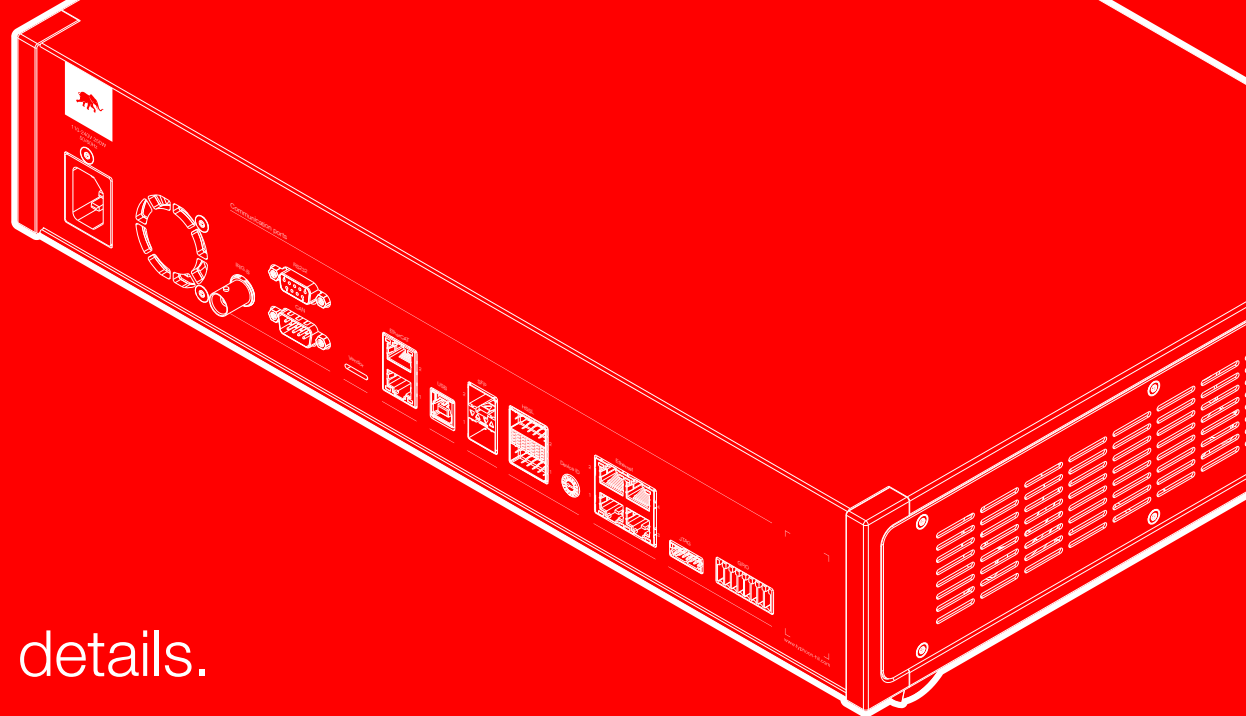
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HIL506

Technical details.

Processor	Processor	Zynq Ultrascale SoC
	Processor configurations	up to 4 processing cores;
Analog inputs (AI)	Channels	16 channels
	Resolution	16 bit ADC
	Input voltage range	± 10 V
	Sample rate	up to 1 MSPS
	Linearity (DNL/INL)	1/2
	Gain error / offset error	0.01% / 1 mV
	Input resistance	6.8 k Ω
	Protection	± 24 V tolerant, ESD protection
Analog Outputs (AO)	Channels	32 channels
	Resolution	16 bit ADC
	Output voltage range	± 10 V
	Sample rate	up to 5 MSPS
	Linearity (DNL/INL)	1/1
	Gain error; offset error	0.01%; 0.5 mV
	Output resistance	~ 0 Ω
	Current capacity	≥ 1 mA
Analog IO connector	Connector	DIN 41612, type C 96 pin male connector
	User Power Supply Unit (PSU)	<ul style="list-style-type: none"> ± 5 V analog up to 2 A, resettable protection ± 12 V analog up to 2 A, resettable protection +3.3 V digital up to 2 A, resettable protection +5 V digital up to 2 A, resettable protection

Digital inputs (DI)	Channels	32 channels
	Input voltage range V_o	-15 V $< V_o < 15$ V
	Threshold voltages (low, high)	$V_{th}(\max) = 0.8$ V; $V_{th}(\min) = 2$ V
	Input resistance	10 k Ω
Digital outputs (DO)	Channels	32 channels
	Output voltage range V_o	0 V $< V_o < 5$ V
	Threshold voltages (low, high)	$V_{oh}(\max) = 0.2$ V; $V_{oh}(\min) = 4.8$ V
	Output resistance	430 Ω
Digital IO connector	Connector type	DIN 41612, type C 96 pin male connector
	Connectivity	<ul style="list-style-type: none"> Ethernet 4x RJ45 connectors; 10/100/1000 Mbps USB3.0 1x Type B connector; 3.0 high speed CAN 1x DB9 male; (2x CAN + 2x CAN FD) RS232 1x DB9 female Time synchronization (IRIG-B) 1x BNC connector EtherCAT 2x RJ45 connectors; 10/100/1000 Mbps High Speed Serial Link (HSSL) 2x SFP + 2x QSFP GPIO 12+ multi-purpose IO pins, terminal blocks JTAG 1x Molex 87833-1420
Housing	Dimensions	19" rack mountable; 2U height (483 mm x 88 mm x 353 mm)
	Weight	5.5 kg
Power supply	Voltage	110 - 240 V
	Power	250 W
	Frequency	50/60 Hz



Find out more information in the **HIL506 Hardware User Guide**.

<https://tinyurl.com/3u686feb>



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<https://tinyurl.com/d6nxrpf3>

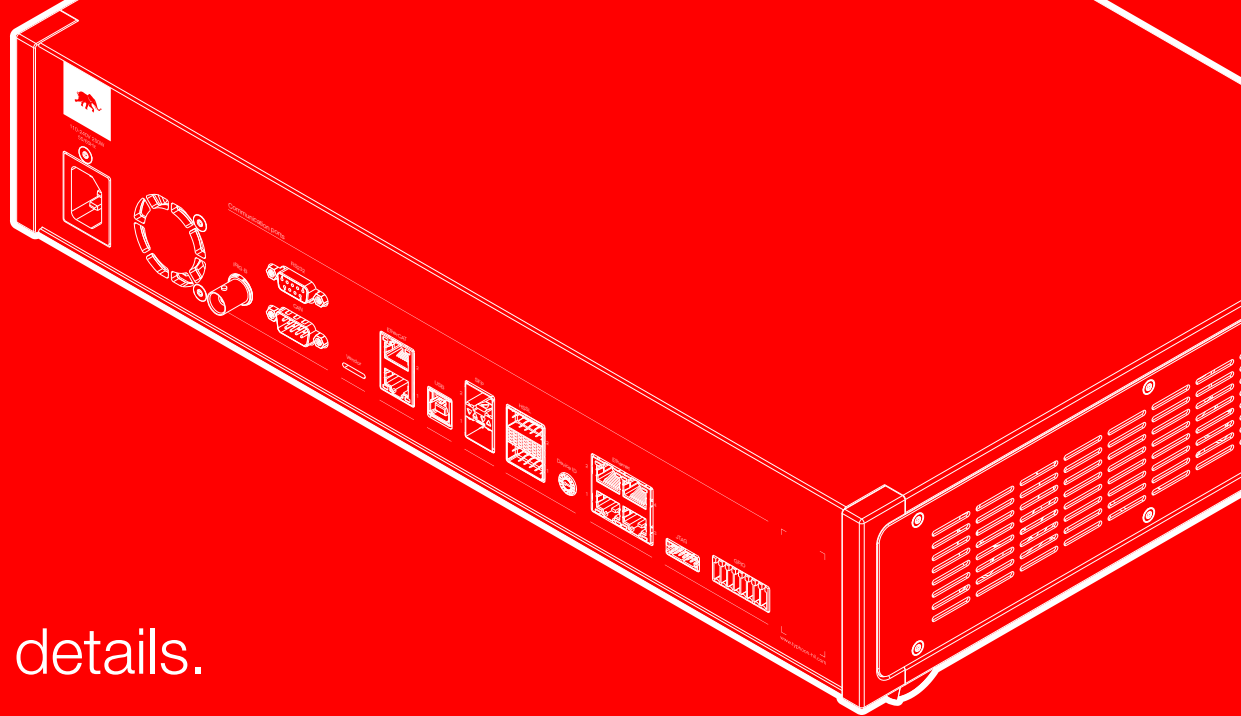


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HIL606

Technical details.



Processor	Processor	ZU4EG Ultrascale+ Zync SoC
	Processor configurations	up to 4 processing cores;
Analog inputs (AI)	Channels	16 channels
	Resolution	16 bit ADC
	Input voltage range	± 10 V
	Sample rate	up to 1 MSPS
	Linearity (DNL/INL)	1/2
	Gain error / offset error	0.01% / 1 mV
	Input resistance	6.8 k Ω
Protection	± 24 V tolerant, ESD protection	
Analog Outputs (AO)	Channels	16 channels
	Resolution	16 bit ADC
	Output voltage range	± 10 V
	Sample rate	up to 5 MSPS
	Linearity (DNL/INL)	1/1
	Gain error; offset error	0.01%; 1 mV
	Output resistance	0 Ω
	Current capacity	≥ 1 mA
Protection	± 24 V tolerant, ESD protection	
Analog IO connector	Connector	DIN 41612, type C 96 pin male connector
User Power Supply Unit (PSU)	± 5 V analog	up to 1 A, resettable protection
	± 12 V analog	up to 0.5 A, resettable protection
	+3.3 V digital	up to 1 A, resettable protection
	+5 V digital	up to 1 A, resettable protection

Digital inputs (DI)	Channels	32 channels
	Input voltage range V_o	-15 V < V_o < 15 V
	Threshold voltages (low, high)	$V_{IL}(\text{max}) = 0.8$ V; $V_{IH}(\text{min}) 205$ V
	Input resistance	10 k Ω
Protection	± 24 V tolerant, ESD protection	
Digital outputs (DO)	Channels	32 channels
	Output voltage range V_o	0 V < V_o < 5 V
	Threshold voltages (low, high)	$V_{OL}(\text{max}) = 0.2$ V; $V_{OH}(\text{min}) 4.8$ V
	Output resistance	430 Ω
Protection	± 24 V tolerant, ESD protection	
Digital IO connector	Connector type	DIN 41612, type C 96 pin male connector
Connectivity	Ethernet	2x RJ45 connectors; 10/100/1000 Mbps
	USB2.0	1x type B connector; 2.0 high speed
	CAN	2x DB9 male
	RS232	2x DB9 female
	High speed serial link	2x SFP ≥ 5 GHz
	JTAG	Molex 87833-1420
	GPIO	12+ multi-purpose IO pins, terminal blocks
Housing	Dimensions	19" rack mountable; 2U height (483 mm x 88 mm x 353 mm)
	Weight	5.5 kg
Power supply	Voltage	110 - 240 V
	Power	250 W
	Frequency	50/60 Hz



Find out more information in the **HIL606 Hardware User Guide**.

<https://tinyurl.com/wz68cfn7>



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<https://tinyurl.com/d6nxrpf3>



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HIL Simulator comparison.



HIL101

HIL404

HIL506

HIL606

Model capacity

Maximum supported Ideal Converter Weight. Learn more	6	12+	18+	24+
Detailed (switching) converter models (1ph / 3ph)	4 / 2	8 / 4	12 / 6	16 / 8
Machine Solvers supported (max.)	1	2+	4+	4+
Distribution network simulation	✓	✓	✓	✓

Time resolution

Minimal simulation step	250 ns	200 ns	200 ns	200 ns
DI sampling resolution	4.5 ns	3.5 ns	3.5 ns	3.5 ns

IO

Analog I/O per unit	16 / 16	16 / 16	16 / 32	32 / 64
Digital I/O per unit	32 / 32	32 / 32	64 / 64	64 / 64

Connectivity

Ethernet, USB 3.0, CAN, RS232, GPIO, HSSL	✓	✓	✓	✓
JTAG	✓	✓	✓	✓
Time synchronization (PPS and IRIG-B)			✓	✓
EtherCAT (master and slave)			✓	✓
FDCAN			✓	✓
SFP, QSFP			✓	✓

Paralleling

up to 4 units (HIL101)	up to 4 units (HIL404)	up to 16 units (HIL506 and HIL606)	up to 16 units (HIL506 and HIL606)
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