

Connector's description

J1 Feedback #1		
Pin	Name	Description
1	A1+/Sin+	Incr. encoder1 A single-ended, or A+ diff. input, or analogue encoder Sin+ diff. input
2	A1-/Sin-/LH1	Incr. encoder1 A- diff. input, or analogue encoder Sin- diff. input if SW2 pin2= ON and pin3=OFF Linear Hall 1 input if SW2 pin2= OFF and pin3=ON
3	B1+/Cos+	Incr. encoder1 B single-ended, or B+ diff. input, or analogue encoder Cos+ diff. input
4	B1-/Cos-/LH2	Incr. encoder1 B- diff. input, or analogue encoder Cos- diff. input if SW2 pin5= ON and pin6=OFF Linear Hall 2 input if SW2 pin5= OFF and pin6=ON
5	Z1+	Incr. encoder1 Z single-ended, or Z+ diff. input
6	Z1-/LH3	Incr. encoder1 Z- diff. input if SW2 pin8= ON and pin9=OFF Linear Hall 3 input if SW2 pin8= OFF and pin9=ON
7	+5V _{OUT}	5V output supply
8	PE	Protection Earth
9	GND	Return ground. Internally connected to all GND signals except STO GND.

J2 Digital Inputs		
Pin	Name	Description
1	GND	Return ground. Internally connected to all GND signals except STO GND.
2	IN0	12-36V general-purpose digital PNP/NPN input
3	IN1	12-36V general-purpose digital PNP/NPN input
4	IN4	12-36V general-purpose digital PNP/NPN input
5	IN5	12-36V general-purpose digital PNP/NPN input
6	IN2/LSP	12-36V digital PNP/NPN input. Positive limit switch input
7	IN3/LSN	12-36V digital PNP/NPN input. Negative limit switch input
8	+V _{LOG}	Positive terminal of the logic supply input: 9 to 36V _{DC} . Internally connected to other +V _{LOG} pins
9	GND	Return ground. Internally connected to all GND signals except STO GND.

J3 Feedback #2		
Pin	Name	Description
1	A2+/Pulse+/Data+/SL+	Incr. encoder2 A+ diff. input, or Pulse+, or Data+ for SSI, or Slave+ for BiSS; has internal 120Ω resistor between pins 1 and 2
2	A2-/Pulse-/Data-/SL-	Incr. encoder2 A- diff. input, or Pulse-, or Data- for SSI, or Slave- for BiSS; has internal 120Ω resistor between pins 1 and 2
3	B2+/Dir+/CLK+/MA+	Incr. encoder2 B+ diff. input, or Dir+, or Clock+ for SSI, or Master+ for BiSS; has internal 120Ω resistor between pins 3 and 4
4	B2-/Dir-/CLK-/MA-	Incr. encoder2 B- diff. input, or Dir-, or Clock- for SSI, or Master- for BiSS; has internal 120Ω resistor between pins 3 and 4
5	Z2+	Incr. encoder2 Z+ diff. input; has internal 120Ω resistor between pins 5 and 6
6	Z2-	Incr. encoder2 Z- diff. input; has internal 120Ω resistor between pins 5 and 6
7	+5V _{OUT}	5V output supply
8	+V _{LOG}	Positive terminal of the logic supply input: 9 to 36V _{DC} . Internally connected to other +V _{LOG} pins
9	PE	Protection Earth
10	GND	Return ground. Internally connected to all GND signals except STO GND.

J8 Serial communication		
Pin	Name	Description
1	232TX	RS-232 Data Transmission.
2	GND	Return ground. Internally connected to all GND signals except STO GND.
3	232RX	RS-232 Data Reception.


J4 Digital Outputs		
Pin	Name	Description
1	GND	Return ground. Internally connected to all GND signals except STO GND.
2	OUT0	12-36V general-purpose digital output, 1.5A PNP/ 2A NPN, software selectable
3	OUT1	12-36V general-purpose digital output, 0.3A PNP/ 0.4A NPN, software selectable
4	OUT4	12-36V general-purpose digital output, 0.3A PNP/ 0.4A NPN, software selectable
5	OUT5	12-36V general-purpose digital output, 0.3A PNP/ 0.4A NPN, software selectable
6	OUT3/Ready	12-36V Ready signal digital output, 0.3A PNP/ 0.4A NPN, software selectable
7	OUT2/Error	12-36V Error signal digital output, 0.3A PNP/ 0.4A NPN, software selectable
8	+V _{LOG}	Positive terminal of the logic supply input: 9 to 36V _{DC} . Internally connected to other +V _{LOG} pins
9	PE	Protection Earth
10	GND	Return ground. Internally connected to all GND signals except STO GND.

J5 Logic supply input		
Pin	Name	Description
1	-V _{LOG}	Negative terminal of the logic supply input: 9 to 36V _{DC} from SELV/ PELV type power supply.
2	+V _{LOG}	Positive terminal of the logic supply input: 9 to 36V _{DC} from SELV/ PELV type power supply.

J6 Digital Hall		
Pin	Name	Description
1	+5V _{OUT}	5V output supply
2	Hall 1	Digital input Hall 1 sensor
3	Hall 2	Digital input Hall 2 sensor
4	Hall 3	Digital input Hall 3 sensor
5	PE	Protection Earth
6	GND	Return ground. Internally connected to all GND signals except STO GND.

J7 STO (Safe Torque Off)			
Pin	Name	Description	
1	STO1-	Safe Torque Off input 1, negative return (opto-isolated, 0V)	Apply between both STO1+, STO2+ and STO1-, STO2- 24V DC from SELV/ PELV power supply for motor PWM output operation
2	STO1+	Safe Torque Off input 1, positive input (opto-isolated, 18+40V)	
3	STO2+	Safe Torque Off input 2, positive input (opto-isolated, 18+40V)	
4	STO2-	Safe Torque Off input 2, negative return (opto-isolated, 0V)	

J9 Analogue inputs			
Pin	Name	Description	
1	PE	Protection Earth	
2	FDBK	Analogue input, 12-bit, 0-5V. Reads analogue feedback (tacho), or general purpose.	
3	+5V _{OUT}	5V output supply.	
4	Temp Mot	NTC/PTC 3.3V input. Used to read an analog temperature value	
5	GND	Return ground. Internally connected to all GND signals except STO GND.	
6	REF+	Analogue Input+, 11-bit for 0...10V	Found as variable REF
7	REF-	Analogue Input-, 11-bit for -10...0V	

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J10 Power input and Motor outputs		
Pin	Name	Description
1	GND	Negative return (ground) of the power supply
2	CR/B-	Chopping Resistor output/ Phase B- for step motors
3	C/B+	Phase C for 3-ph motors, B+ for 2-ph steppers
4	B/A-	Phase B for 3-ph motors, A- for 2-ph steppers, Motor- for DC brush motors
5	A/A+	Phase A for 3-ph motors, A+ for 2-ph steppers, Motor+ for DC brush motors
6	PE	Earth connection
7	PE	Earth connection
8	+Vmot	Positive terminal of the motor supply: 12 to 48V _{DC} .

J21 & J22 EtherCAT
EtherCAT standard RJ45 Ethernet IN/OUT ports.

SW1 – Axis ID settings	
Position	Description
1..8	8-bit H/W Axis ID register Switch 1 is Bit 0... Switch 8 is Bit 7 of the Axis value. Switch ON -> Bit = 0 Switch OFF -> Bit = 1 AxisID values: from 1 to 255. AxisID = 255 also when all switches are ON. In EtherCAT, when Axis ID is 255, the register called "configured station alias" will be 0.

SW2 – Feedback #1 Signal routing and termination resistors	
Position	Description
1	Internally connect 120Ω termination resistor between J1 pin 1 and 2.
2	Internally connect A1-/Sin- signal to J1 pin2; Remark: If this pin is ON, SW2 pin 3 must be OFF.
3	Internally connect Linear Hall 1 (LH1) signal to J1 pin2; Remark: If this pin is ON, SW2 pin 2 must be OFF.
4	Internally connect 120Ω termination resistor between J1 pin 3 and 4.
5	Internally connect B1-/Cos- signal to J1 pin4; Remark: If this pin is ON, SW2 pin 6 must be OFF.
6	Internally connect Linear Hall 2 (LH2) signal to J1 pin4; Remark: If this pin is ON, SW2 pin 5 must be OFF.
7	Internally connect 120Ω termination resistor between J1 pin 5 and 6.
8	Internally connect Z1- signal to J1 pin6; Remark: If this pin is ON, SW2 pin 9 must be OFF.
9	Internally connect Linear Hall 3 (LH3) signal to J1 pin6; Remark: If this pin is ON, SW2 pin 8 must be OFF.
10	Reserved.

LEDs	
LED1 - yellow	Indicates that logic supply is present.
ECAT ERR - red	Turned on when the drive detects an error condition.
ECAT RUN - green	Lit after power-on when the drive initialization ends. Turned off when an error occurs.

Electrical characteristics


All parameters measured under the following conditions (unless otherwise specified):

- V_{LOG} = 24 VDC; V_{MOT} = 48VDC; F_{PWM} = 20kHz
- Supplies start-up / shutdown sequence: -any-
- Load current (sinusoidal amplitude) = 14.1 A

Operating Conditions		Min.	Typ.	Max.	Units	
Ambient temperature		0		40 ¹	°C	
Ambient humidity	Non-condensing	0		90	%Rh	
Altitude / pressure ²	Altitude (vs. sea level)	-0.1	0 ± 2.5	2	Km	
	Ambient Pressure	0 ²	0.75 ± 1	10.0	atm	
Storage Conditions		Min.	Typ.	Max.	Units	
Ambient temperature		-40		100	°C	
Ambient humidity	Non-condensing	0		100	%Rh	
Ambient Pressure		0		10.0	atm	
ESD capability (Human body model)	Not powered; applies to any accessible part			±0.5	kV	
	Original packaging			±15	kV	
Mechanical Mounting		Min.	Typ.	Max.	Units	
Airflow					natural convection ³ , closed box	
Spacing required for vertical mounting	Between adjacent drives	30			mm	
	Between drives and nearby walls	30			mm	
	Between drives and roof-top	20			mm	
Spacing required for horizontal mounting	Between adjacent drives	4			mm	
	Between drives and nearby walls	5			mm	
	Space needed for drive removal	10			mm	
	Between drives and roof-top	15			mm	
Insertion force	Using recommended mating connectors		12	8	N	
Extraction force		8	10		N	
Environmental Characteristics		Min.	Typ.	Max.	Units	
Size (Length x Width x Height)	Global size			93 x 43.8 x 32	mm	
				~3.66 x 1.72 x 1.26	inch	
Weight			~80		g	
Cleaning agents	Dry cleaning is recommended				Only Water- or Alcohol- based	
Protection degree	According to IEC60529, UL508			IP20	-	
Logic Supply Input (+V _{LOG})		Min.	Typ.	Max.	Units	
Supply voltage	Nominal values	9		36	V _{DC}	
	Absolute maximum values, drive operating but outside guaranteed parameters	8		40	V _{DC}	
	Absolute maximum values, continuous	-0.6		42	V _{DC}	
	Absolute maximum values, surge (duration ≤ 10ms) [†]	-1		+45	V	
Supply current	+V _{LOG} = 12V		150		mA	
	+V _{LOG} = 24V		100			
	+V _{LOG} = 40V		80			
Motor Supply Input (+V _{MOT})		Min.	Typ.	Max.	Units	
Supply voltage	Nominal values	11		50	V _{DC}	
	Absolute maximum values, drive operating but outside guaranteed parameters	9		52	V _{DC}	
	Absolute maximum values, continuous	-0.6		54	V _{DC}	
	Absolute maximum values, surge (duration ≤ 10ms) [†]	-1		57	V	
Supply current	Idle		1	5	mA	
	Operating	-40	±10	+40		A
	Absolute maximum value, short circuit condition (duration ≤ 10ms) [†]			43		A
Supply Output (+5V)		Min.	Typ.	Max.	Units	
Output voltage	Current sourced = 250mA	4.95	5.11	5.25	V	
Output current		360	450		mA	
Short-circuit					NOT protected	
Over-voltage					NOT protected	
ESD protection	Human body model	±1			kV	
Isolation PE (earth) – GND				±250	V	

¹Operating temperature at higher temperatures is possible with reduced current and power ratings
²iPOS4810 can be operated in vacuum (no altitude restriction), but at altitudes over 2,500m, current and power rating are reduced due to thermal dissipation efficiency.

³In case of forced cooling (conduction or ventilation) the spacing requirements may drop substantially down to zero as long as the ambient temperature is kept below the maximum operating limit

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Motor Outputs (A/A+, B/A-, C/B+, CR/B-)		Min.	Typ.	Max.	Units
Nominal current	PMSM motors sinusoidal amplitude			14.1	A
	PMSM motors sinusoidal RMS			10	A _{RMS}
	DC/BLDC motors continuous			12.2	A
Peak current	maximum 1.56 s	-40		+40	A
Short-circuit protection threshold		±43		±43	A
Short-circuit protection delay			3.3		µs
On-state voltage drop	Nominal output current; including typical mating connector contact resistance		0.15		V
Voltage efficiency			100		%
Off-state leakage current			±0.5	±1	mA
Motor inductance (phase-to-phase)	Recommended value, for current ripple max. ±5% of full range; +V _{MOT} = 36 V	F _{PWM}			µH
		20 kHz	400		
		40 kHz	200		
		60 kHz	150		
		80 kHz	100		
	Minimum value, limited by short-circuit protection; +V _{MOT} = 36 V	20 kHz	150		µH
		40 kHz	50		
		60 kHz	40		
		80 kHz	20		
		100 kHz	10		
Motor electrical time-constant (L/R)	Recommended value for ±5% current measurement error	20 kHz	330		µs
		40 kHz	170		
		60 kHz	140		
		80 kHz	80		
		100 kHz	66		
Current measurement	FS = Full Scale accuracy	-9.3	+/- 3.4	+9.3	%FS
Digital Hall Inputs (Hall1, Hall2, Hall3)		Min.	Typ.	Max.	Units
Mode compliance		TTL / CMOS / Open-collector			
Default state		Logic HIGH			
Input voltage	Logic "LOW"		0	0.8	V
	Logic "HIGH"	2	5		
	Floating voltage (Not connected)		4.4		
	Absolute maximum, surge (duration ≤ 1s) [†]	-10		+15	
Input current	Logic "LOW"; Pull to GND			1.2	mA
	Logic "HIGH"; Internal 4.7KΩ pull-up to +5	0	0	0	
Minimum pulse width		2			µs
ESD protection	Human body model	±5			kV
Linear Hall Inputs (LH1, LH2, LH3)		Min.	Typ.	Max.	Units
Input voltage	Operational range	0	0.5+4.5	4.9	V
Input voltage	Absolute maximum values, continuous	-7		+7	V
	Absolute maximum, surge (duration ≤ 1s) [†]	-11		+14	
Input current	Input voltage 0...+5V	0		0.2	mA
Interpolation Resolution	Depending on software settings			11	bits
Frequency		0		1	kHz
ESD protection	Human body model	±1			kV
Digital Inputs (IN0, IN1, IN2/LSP, IN3/LSN, IN4, IN5)¹		Min.	Typ.	Max.	Units
Mode compliance		PNP			
Default state		Logic LOW			
Input voltage	Logic "LOW"	-10	0	2.2	V
	Logic "HIGH"	6.3	24	36	
	Hysteresis	1.2	2.4	2.8	
	Floating voltage (not connected)		0		
	Absolute maximum, continuous	-10		+39	
	Absolute maximum, surge (duration ≤ 1s) [†]	-20		+40	
Input current	Logic "LOW"; pulled to GND		0		mA
	Logic "HIGH"		8	10	

Mode compliance		NPN			
Default state		Logic HIGH			
Input voltage	Logic "LOW"		0	2.2	V
	Logic "HIGH"	6.3	24	36	
	Hysteresis	1.2	2.4	2.8	
	Floating voltage (not connected)		15		
	Absolute maximum, continuous	-10		+39	
Input current	Absolute maximum, surge (duration ≤ 1s) [†]	-20		+40	mA
	Logic "LOW"; Pulled to GND		8	10	
Input frequency	Logic "HIGH"; Pulled to +24V	0	0	0	kHz
		0		10	
Minimum pulse		6			µs
ESD protection	Human body model	±5			kV
Encoder1 Inputs (A1/A1+, A1-, B1/B1+, B1-, Z1/Z1+, Z1-)		Min.	Typ.	Max.	Units
Single-ended mode compliance		TTL / CMOS / Open-collector			
Input voltage, single-ended mode A/A+, B/B+	Logic "LOW"			1.6	V
	Logic "HIGH"	1.8			
Input voltage, single-ended mode Z/Z+	Floating voltage (not connected)		3.3		V
	Logic "LOW"			1.2	
Input current, single-ended mode A/A+, B/B+, Z/Z+	Logic "HIGH"	1.4			mA
	Floating voltage (not connected)		4.7		
Differential mode compliance	For full RS422 compliance, see ²	TIA/EIA-422-A			
Input impedance, differential	Logic "LOW"; Pull to GND		5.5	6	kΩ
	Logic "HIGH"; Internal 2.2KΩ pull-up to +5	0	0	0	
Input voltage, differential mode	Hysteresis	±0.06	±0.1	±0.2	V
	Common-mode range (A+ to GND, etc.)	-7		+7	
Input frequency	A1+ to A1-, B1+ to B1-, Z1+ to Z1-		1		MHz
	Single-ended mode, Open-collector / NPN	0		5	
Minimum pulse width	Differential mode, or Single-ended driven by push-pull (TTL / CMOS)	0		10	MHz
	Single-ended mode, Open-collector / NPN	1			
Input voltage, any pin to GND	Differential mode, or Single-ended driven by push-pull (TTL / CMOS)	50			ns
	Absolute maximum values, continuous	-7		+7	
ESD protection	Absolute maximum, surge (duration ≤ 1s) [†]	-11		+14	V
	Human body model	±1			
Digital Outputs (OUT1, OUT2/Error, OUT3/Ready, OUT4, OUT5)³		Min.	Typ.	Max.	Units
Mode compliance		PNP 24V			
Default state		High-Z (floating)			
Output voltage	Normal operation	Logic "High"			
	Logic "HIGH"; output current = 0.3A		V _{LOG-1.0}	V _{LOG-2.0}	V
	Logic "LOW"; output current = 0, no load	open-collector			
	Logic "HIGH", external load to GND		0		
	Absolute maximum, continuous	-0.3		V _{LOG+0.3}	
	Absolute maximum, surge (duration ≤ 1s) [†]	-0.5		V _{LOG+0.5}	
Output current	Logic "HIGH", source current, continuous			0.3	
	Logic "HIGH", source current, pulse ≤ 5 s			0.4	A
	Logic "LOW", means High-Z			20	µA
Minimum pulse width		3	1.5		µs
ESD protection	Human body model	±15			kV

¹ The digital inputs and outputs are software selectable as PNP or NPN

³ The digital inputs and outputs are software selectable as PNP or NPN

² For full RS-422 compliance, 120Ω termination resistors must be connected across the differential pairs, as close as possible to the drive input pins via SW2.

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Mode compliance		NPN 24V			
Default state	Not supplied (+V _{LOG} floating or to GND)	High-Z (floating)			
	Normal operation	High-Z			
Output voltage	Logic "LOW"; output current = 0.4A	0.6	1.3	V	
	Logic "HIGH"; output current = 0, no load	open-collector			
	Logic "HIGH", external load to +V _{LOG}	V _{LOG}			
	Absolute maximum, continuous	-0.3	V _{LOG} +0.3		
Output current	Absolute maximum, surge (duration ≤ 1s) [†]	-0.5	V _{LOG} +0.5		
	Logic "LOW", sink current, continuous		0.4	A	
	Logic "LOW", sink current, pulse ≤ 5 s		0.5	A	
	Logic "HIGH", means High-Z		20	μA	
Minimum pulse width		5	1.8		μs
ESD protection	Human body model	±15			kV

OUT0 – Brake or general-purpose digital output³ **Min.** **Typ.** **Max.** **Units**

Mode compliance		PNP 24V			
Default state	Not supplied (+V _{LOG} floating or to GND)	High-Z (floating)			
	Normal operation	Logic "High"			
Output voltage	Logic "HIGH"; output current = 1.5A	V _{LOG} -0.4	V _{LOG} -0.7	V	
	Logic "LOW"; output current = 0, no load	open-collector			
	Logic "HIGH", external load to GND	0			
	Absolute maximum, continuous	-0.3	V _{LOG} +0.3		
Output current	Absolute maximum, surge (duration ≤ 1s) [†]	-0.5	V _{LOG} +0.5		
	Logic "HIGH", source current, continuous		1.5	A	
	Logic "HIGH", source current, pulse ≤ 5 s		2.0	A	
	Logic "LOW", means High-Z		50	μA	
Minimum pulse width		30	15		μs
ESD protection	Human body model	±15			kV

Mode compliance		NPN 24V			
Default state	Not supplied (+V _{LOG} floating or to GND)	High-Z (floating)			
	Normal operation	High-Z			
Output voltage	Logic "LOW"; output current = 2.0A	0.2	0.3	V	
	Logic "HIGH"; output current = 0, no load	open-collector			
	Logic "HIGH", external load to +V _{LOG}	V _{LOG}			
	Absolute maximum, continuous	-0.3	V _{LOG} +0.3		
Output current	Absolute maximum, surge (duration ≤ 1s) [†]	-0.5	V _{LOG} +0.5		
	Logic "LOW", sink current, continuous		2.0	A	
	Logic "LOW", sink current, pulse ≤ 5 s		2.5	A	
	Logic "HIGH", means High-Z		50	μA	
Minimum pulse width		30	10		μs
ESD protection	Human body model	±15			kV

RS-232		Min.	Typ.	Max.	Units
Compliance					
TIA/EIA-232-C					
Bit rate	Software selectable	9600		115200	Baud
Short-circuit	232TX short to GND	Guaranteed			
ESD protection	Human body model	±2			kV

Encoder2 Inputs (A2+/Data+, A2-/Data-, B2+/Clk+, B2-/Clk-, Z2+, Z2-) ¹		Min.	Typ.	Max.	Units
Differential mode compliance					
TIA/EIA-422-A					
Input voltage	Hysteresis	±0.06	±0.1	±0.2	V
	Differential mode	-14		+14	
	Common-mode range (A+ to GND, etc.)	-11		+14	
Input impedance, differential	A2+, B2+, Z2+ A2-, B2-, Z2-		150		Ω
Input frequency	Differential mode	0		10	MHz
Minimum pulse width	Differential mode	50			ns

BISS / SSI / EnDAT / TAMAGAWA / Panasonic / Nikon / Sanyo Denki Encoder Interface from J3 **Min.** **Typ.** **Max.** **Units**

Differential mode (CLOCK, DATA) ¹	For full RS422 compliance, see ¹	TIA/EIA-422			
CLOCK Output voltage	Differential; 50Ω differential load	2.0	2.5	5.0	V
	Common-mode, referenced to GND	2.3	2.5	2.7	
CLOCK frequency	Software selectable	1000, 2000, 3000			kHz
DATA Input hysteresis	Differential mode	±0.1	±0.2	±0.5	V
Data input impedance	Termination resistor on-board		120		Ω
DATA Input common mode range	Referenced to GND	-7		+12	
	Absolute maximum, surge (duration ≤ 1s) [†]	-25		+25	
DATA format	Software selectable	Binary / Gray			
		Single-turn / Multi-turn			
		Counting direction			
DATA resolution	Single-turn			56	Bits
	Multi-turn and single-turn			56	
If total resolution >31 bits, some bits must be ignored by software setting to achieve a max 31 bits resolution					

Sin-Cos Encoder Inputs (Sin+, Sin-, Cos+, Cos-) **Min.** **Typ.** **Max.** **Units**


Input voltage, differential	Sin+ to Sin-, Cos+ to Cos-		1	1.25	V _{PP}
Input voltage, any pin to GND	Operational range	-1	2.5	4	V
	Absolute maximum values, continuous	-7		+7	
	Absolute maximum, surge (duration ≤ 1s) [†]	-11		+14	
Input impedance	Differential, Sin+ to Sin-, Cos+ to Cos- ²	4.2	4.7		kΩ
	Common-mode, to GND		2.2		kΩ
Resolution with interpolation	Software selectable, for one sine/cosine period	2		10	bits
Frequency	Sin-Cos interpolation	0		450	kHz
	Quadrature, no interpolation	0		10	MHz
ESD protection	Human body model	±1			kV

Analog 0...5V Inputs (REF, FDBK) **Min.** **Typ.** **Max.** **Units**

Input voltage	Operational range	0		5	V
	Absolute maximum values, continuous	-12		+18	
	Absolute maximum, surge (duration ≤ 1s) [†]			±36	
Input impedance	To GND		28		kΩ
Resolution			12		bits
Integral linearity				±2	bits
Offset error			±2	±10	bits
Gain error			±1%	±3%	% FS ³
Bandwidth (-3db)	Software selectable	0		1	kHz
ESD protection	Human body model	±5			kV

¹ Feedback#2 differential input pins have internal 120Ω termination resistors connected across
² An 120Ω termination resistor should be connected across SIN+ to SIN-, and across COS+ to COS- signals.


³ "FS" stands for "Full Scale"

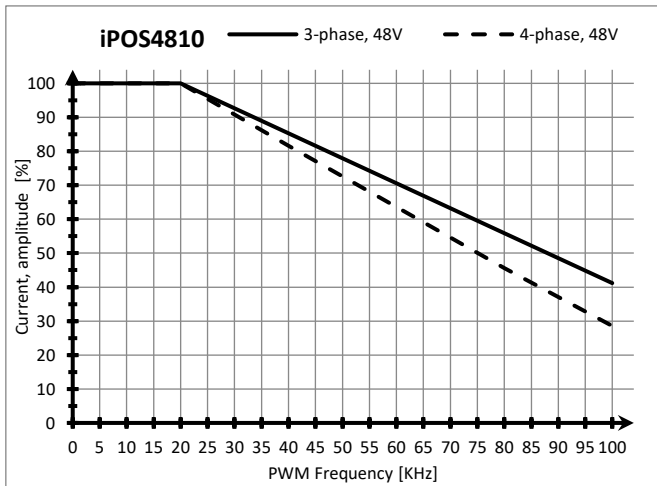
Name	First edition	Document template: P099.TQT.564.0001	Last edition	Visa:
ALN	August 31, 2021		November 1, 2023	AS, AN
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Analog +/-10V Input (REF)		Min.	Typ.	Max.	Units
Input voltage	Operational range	-10		+10	V
	Absolute maximum values, continuous	-15		+15	
	Absolute maximum, surge (duration ≤ 1s) [†]			±20	
Input impedance	To GND		50		kΩ
	Differential		80		
Resolution			12		bits
Integral linearity				±2	bits
Offset error			±10	±35	bits
Gain error			±2%	±5%	% FS ¹
Bandwidth (-3db)	Software selectable	0		1	kHz
ESD protection	Human body model	±15			kV
Safe torque OFF (STO1+, STO1-, STO2+, STO2+)		Min.	Typ.	Max.	Units
Safety function	According to EN61800-5-2	STO (Safe Torque OFF)			
EN 61800-5-1/ -2 and EN 61508-5-3/ -4 Classification	Safety Integrity Level	safety integrity level 3 (SIL3)			
	PFHD (probability of dangerous failures per hour)	8*10 ⁻¹⁰	hour ⁻¹ (0.8 FIT)		
EN13849-1 Classification	Performance Level	Cat3/PLe			
	MTTFM (meantime to dangerous failure)	377			years
Mode compliance		PNP			
Default state	Input floating (wiring disconnected)	Logic LOW			
Input voltage	Logic "LOW"	-20		5.6	V
	Logic "HIGH"	18		36	
	Absolute maximum, continuous	-20		+40	
Input current	Logic "LOW", pulled to GND		0		mA
	Logic "HIGH", pulled to +Vlog		5	13	
Repetitive test pulses	Ignored high-low-high			5	ms
	-			20	Hz
Fault reaction time	From internal fault detection to register DER bit 14 =1 and OUT2/Error high-to-low			30	ms
PWM operation delay	From external STO low-high transition to PWM operation enabled			30	ms
ESD protection	Human body model	±2			kV
Ethernet Ports		Min.	Typ.	Max.	Units
Standard Compliance	EtherCAT (IEC61158-3/4/5/6-12)				
	Fast Ethernet 100BASE-TX (IEEE802.3u)				
	Auto-negotiation for 100Mbps/s full-duplex				
	Auto-detect MDI/MDI-X				
Power over Ethernet	NOT used by the iPOS4810, requires separate +Vlog SELV/ PELV supply	compliant to IEEE802.3af mode A "Mixed DC & Data" NOT compliant to IEEE802.3af mode B "DC on Spares"			
Isolation GND0, GND1	Requirement for motherboard PCB routing	500			V _{rms}
		1.5			kV _{peak}
Maximum cable length	2-pair UTP Cat5	100	150		m
ESD protection	Human body model	±4			kV
Conformity		Min.	Typ.	Max.	Units
EU Declaration	2014/30/EU (EMC), 2014/35/EU (LVD), 2011/65/EU (RoHS), 1907/2006/EC (REACH), 93/68/EEC (CE Marking Directive), EC 428/2009 (non dual-use item, output frequency limited to 590Hz)				

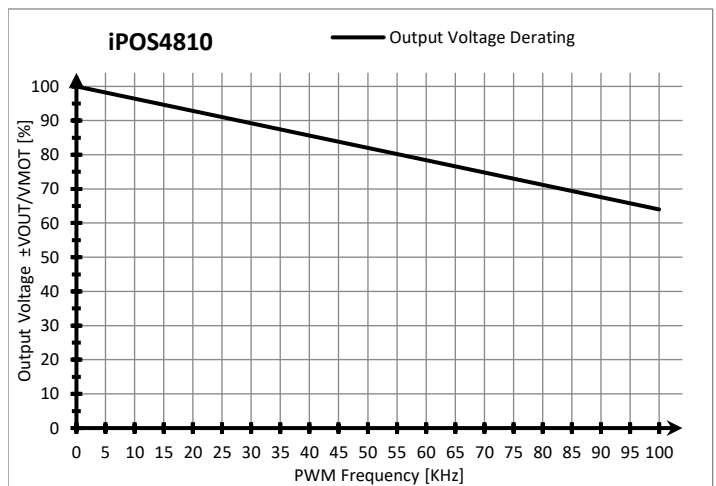
[†] Stresses beyond values listed under "absolute maximum ratings" may cause permanent damage to the device. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

¹ "FS" stands for "Full Scale"

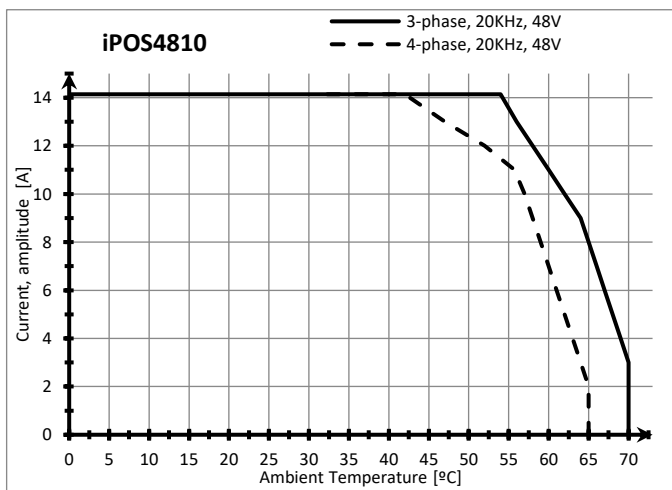
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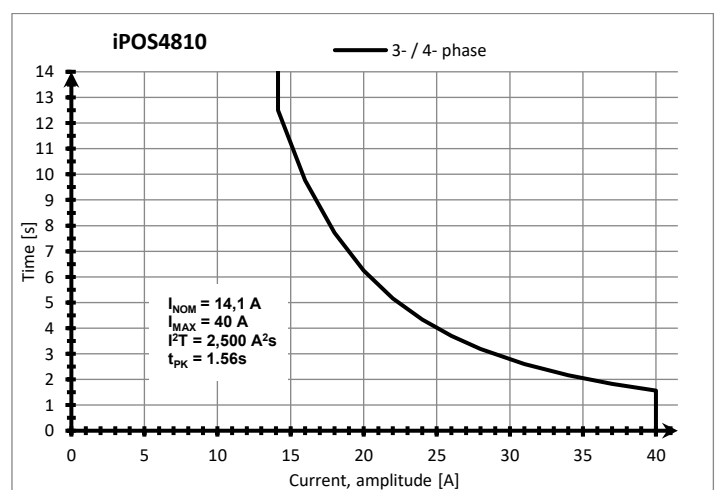
iPOS4810 – Current de-rating with PWM frequency



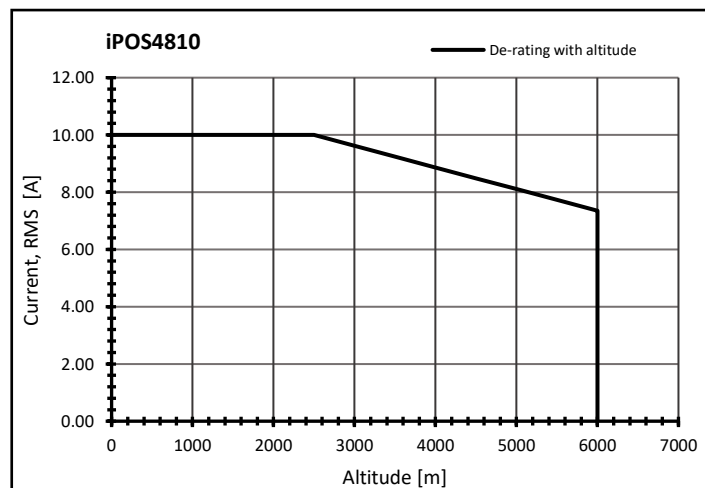
iPOS4810 – Output Voltage de-rating with PWM frequency




iPOS4810 – Current de-rating with ambient temperature



iPOS4810 – Over-current diagram (No heatsink)



iPOS4810 MZ – De-rating with the altitude

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