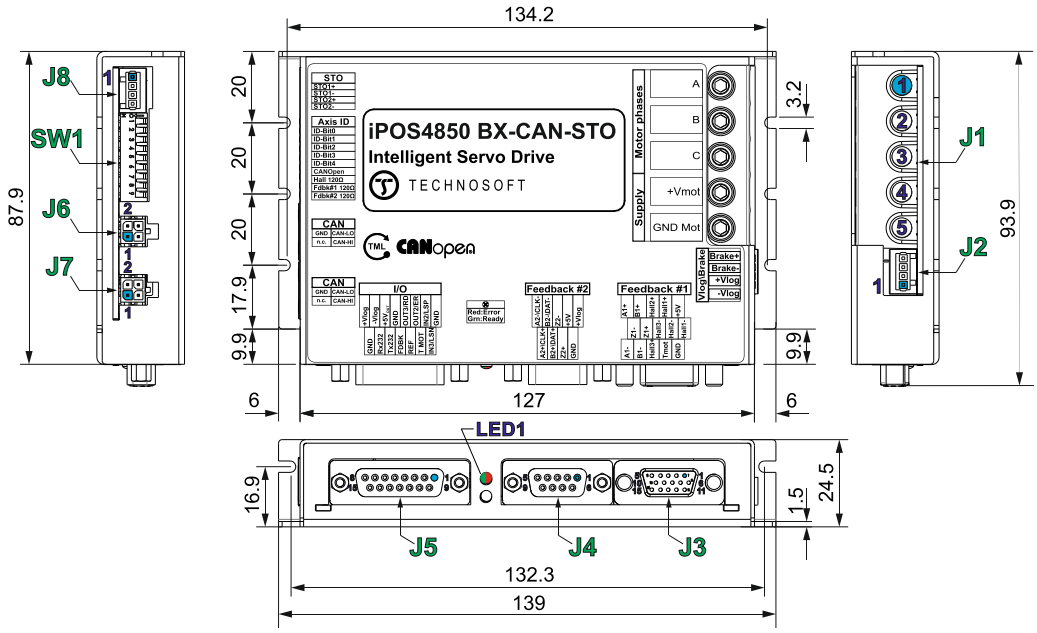
iPOS4850 BX-CAN-STO DATASHEET
P/N: P029.300.E301



Global tolerance [mm]	0.1

All dimensions are in mm. Drawings not to scale.

Features

- Motion controller and drive in a single compact unit based on MotionChip™ technology
- Universal solution for control of rotary and linear brushless and brushed motors
- Advanced motion control capabilities (PVT, S-curve, electronic cam)
- Motor supply: 12-60V; Logic supply: 9-36V
- Output current with / without external heat sink:
  - Nominal: 45 / 35.4A_{RMS} (64 / 50A sinusoidal amplitude)
  - Peak: 64A_{RMS} (90A sinusoidal amplitude)
- Thermal Protection: The internal temperature sensor disables the PWM outputs if the measured temperature exceeds 95ºC
- Feedback Devices (dual-loop support)

  1st feedback devices supported:
  - Incremental encoder interface (single ended or differential)
  - pulse & direction interface (single-ended or differential) for external (master) digital reference
  - Digital Hall sensor interface (single-ended and open collector)

  2nd feedback devices supported:
  - Incremental encoder interface (single ended or differential)
  - pulse & direction interface (single ended or differential) for external (master) digital reference
  - BISS / SSI / EnDAT / TAMAGAWA / Panasonic/ Nikon/ Sanyo Denki encoder interface
- 2 digital PNP inputs, 7-36V: 2 limit switches
- 2 digital outputs, 5-36V, NPN open-collector: Ready, Error 0.5A
- Solenoid driver for motor brake, 2A, commanded by OUT0 NPN type
- 2 analogue inputs, 12-bit, 0-5V: Reference and Feedback (for Tacho), or general purpose
- Communication interfaces: RS-232, TMLCAN and CANopen (CiA 301 v4.2, CiA 305 v.2.2.13 and CiA 402 v3.0) protocols
- 32 h/w addresses selectable by DIN switch
- 16k x 16 SRAM memory for data acquisition
- 24k x16 E2ROM to store setup data, TML motion programs, cam tables and other user data
- *STO: 2 safe torque-off inputs, 18-36V, safety integrity level SIL3/Cat3/PLe acc. to EN61800-5-1; -2/ EN61508-3; -4/ EN ISO13849-1.

*The STO circuit must be supplied with minimum 18V to enable PWM output

Sensor \ Motor	PMSM	BLDC	DC BRUSH
Incr. Encoder	✓		✓
Incr. Encoder + Dig. Hall	✓	✓	
SSI / BiSS-C / EnDAT / Tamagawa / Panasonic / Nikon / Sanyo Denki	✓	✓	✓
Tacho			✓

Mating Connectors

Ref	Producer	Part No.	Description
J2&J8	Wago	733-104	Pluggable terminal block 4-pole Pin spacing 2.5 mm
J3	generic 15-pin High Density D-Sub male		Feedback #1 + Digital Hall input
J4	generic		9-pin Sub-D male
J5	generic 15-pin D-Sub male, DB15		I/O; Analog; RS232
J6&J7	Molex	43025-0400	MICRO-FIT receptacle housing, 2x2 way
		43030-0007	CRIMP PIN, MICROFIT, 5A
J1	High AMP wire. 4mm HEX socket. AWG 6-16 wire gauge. Strip: - min 8 mm for cables with isolation diameter less than 6.5 mm; - min 12 mm/ max 15 mm for cables with isolation diameter bigger than 6.5 mm.		
	Avoid generating metal debris/filings into drive from the wire leads! In case of multi-stranded wires, a proper ferrule must be used as wire terminal.		

* For more recommendations about wires and ferrules, check the User Manual of the drive.

** Connector delivered with the drive

J1

Pin	Name	Description
1	A/A+	Phase A for 3-ph motors, Motor+ for DC brush motors
2	B/A-	Phase B for 3-ph motors, Motor- for DC brush motors
3	C	Phase C for 3-ph motors
4	$+V_{MOT}$	Positive terminal of the motor supply input: 11 to $60V_{DC}$
5	GND	Ground for motor supply

J2

Pin	Name	Description
1	$-V_{LOG}$	Negative terminal of the logic supply input: 9 to $36V_{DC}$ from SELV/ PELV type power supply; connected internally to all GND pins
2	$+V_{LOG}$	Positive terminal of the logic supply input: 9 to $36V_{DC}$ from SELV/ PELV type power supply; connected internally to all $+V_{log}$ pins
3	BRAKE-	Negative terminal for the motor brake input; commanded as OUT0; connected internally to all GND pins
4	BRAKE+	Positive terminal for the motor brake input; connected internally to all +Vlog pins

J3

Pin	Name	Description
1	$+5V_{OUT}$	5V output supply for I/O usage
2	Hall 1+	Digital input Hall 1 sensor input or Hall1+ diff. sensor input; for differential connection SW1 bit 7 must be ON
3	Hall 2+	Digital input Hall 2 sensor input or Hall2+ diff. sensor input; for differential connection SW1 bit 7 must be ON
4	B1+	Incr. encoder 1 B single-ended input, B1+ diff. input; for differential connection SW1 bit 8 must be ON
5	A1+	Incr. encoder 1 A single-ended input, A1+ diff. input; for differential connection SW1 bit 8 must be ON
6	Hall 1-	Hall1- diff. sensor input; for differential connection SW1 bit 7 must be ON
7	Hall 2-	Hall2- diff. sensor input; for differential connection SW1 bit 7 must be ON
8	Hall 3-	Hall3- diff. sensor input; for differential connection SW1 bit 7 must be ON
9	Z1+	Incr. encoder 1 Z single-ended input, Z1+ diff.; for differential connection SW1 bit 8 must be ON
10	Z1-	Incr. encoder 1 Z- diff. input; for differential connection SW1 bit 8 must be ON
11	GND	Return ground for sensors supply
12	Temp Mot	Analogue input, 12-bit, 0-3.3V. Used to read an analog temperature value
13	Hall 3+	Digital input Hall 3 sensor input or Hall3+ diff. sensor input; for differential connection SW1 bit 7 must be ON
14	B1-	Incr. encoder 1 B1- diff. input; for differential connection SW1 bit 8 must be ON
15	A1-	Incr. encoder 1 A1- diff. input; for differential connection SW1 bit 8 must be ON

J4

Pin	Name	Description
1	$+V_{LOG}$	Positive terminal of the logic supply input: 9 to 36VDC; connected internally to all +Vlog pins
2	$+5V_{OUT}$	5V output supply
3	Z2-	Incr. encoder 2 Z- diff. input; for differential connection SW1 bit 9 must be ON
4	B2-/ Dir-/ Data-/SL-	Incr. encoder 2 B2- diff. input or Dir-, or Data- for SSI, or Slave- for BiSS; for differential connection SW1 bit 9 must be ON
5	A2-/ Pulse-/CLK-/MA-	Incr. encoder 2 A- diff. input, or Pulse-, or Clock- for SSI, or Master- for BiSS; or differential connection SW1 bit 9 must be ON
6	GND	Ground
7	Z2+	Incr. encoder 2 Z single-ended input, Z2+ diff. input; for differential connection SW1 bit 9 must be ON
8	B2+/ Pulse+/ Data+/ SL+	Incr. encoder 2 B single-ended input, B2+ diff. input or Pulse+, or Data+ for SSI, or Slave+ for BiSS; for differential connection SW1 bit 9 must be ON
9	A2+/ Pulse+/ CLK+/ MA+	Incr. encoder 2 A single-ended input, A2+ diff. input or Pulse+, or Clock+ for SSI, or Master+ for BiSS; for differential connection SW1 bit 9 must be ON

J5

Pin	Name	Description
1	GND	Ground
2	IN2/LSP	5-36V digital PNP input. Positive limit switch input
3	OUT2/ Error	5-36V 0.5A, active low, NPN open-collector/TTL pull-up. Drive Error output (default). Can be set as general-purpose output.
4	OUT3/ Ready	5-36V 0.5A, active low, NPN open-collector/TTL pull-up. Drive Ready output (default). Can be set as general-purpose output.
5	GND	Ground
6	$+5V_{OUT}$	5V output supply
7	$-V_{LOG}$	Negative terminal of the logic supply input: 9 to $36V_{DC}$ from SELV/ PELV type power supply; connected internally to all GND pins
8	$+V_{LOG}$	Positive terminal of the logic supply input: 9 to $36V_{DC}$ from SELV/ PELV type power supply; connected internally to all $+V_{log}$ pins
9	IN3/LSN	5-36V digital PNP input. Negative limit switch input
10	Temp Mot	Analogue input, 12-bit, 0-3.3V. Used to read an analog temperature value
11	REF	Analogue input, 12-bit, 0-5V
12	FDBK	Analogue input, 12-bit, 0-5V
13	232TX	RS-232 Data Transmission
14	232RX	RS-232 Data Reception
15	GND	Ground

J6, J7

Pin	Name	Description
1	-	Reserved. Do not use.
2	GND	Return ground for CAN-Bus
3	Can-Hi	CAN-Bus positive line (dominant high)
4	Can-Lo	CAN-Bus negative line (dominant low)

J8

Pin	Name	Description	
1	STO1+	Safe Torque Off input 1, positive input (Opto-isolated, 18÷36V)	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, negative return (Opto-isolated, 0V)	
3	STO2+	Safe Torque Off input 2, positive input (Opto-isolated, 18÷36V)	
4	STO2-	Safe Torque Off input 2, negative return (Opto-isolated, 0V)	

SW1

Pin	Name	Description
1	ID-Bit0	Hardware AxisID selection switches All ON – AxisID= 31 All OFF – AxisID = 255 If AxisID = 255 in CANopen, the drive will be in "LSS inactive" state and the Green LED will flash at 1 second intervals
2	ID-Bit1	
3	ID-Bit2	
4	ID-Bit3	
5	ID-Bit4	
6	CANOpen	ON - Select CANopen communication protocol OFF - Select TMLCAN communication protocol
7	Hall 120Ω	Internally connects 120Ω termination resistors between J3.2 and J3.6; J3.3 and J3.7; J3.13 and J3.8.
8	Fdbk #1 120Ω	Internally connects 120Ω termination resistors between J3.5 and J3.15; J3.4 and J3.14; J3.9 and J3.10.
9	Fdbk #2 120Ω	Internally connects 120Ω termination resistors between J4.9 and J4. 5; J4.8 and J4.4; J4.7 and J4.3.

LEDs

Name	Color	Description
LED1	RED	Turned on when the drive detects an error condition
	GREEN	Lit after power-on when the drive initialization ends. Turned off when an error occurs.

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Electrical characteristics

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

- T_{amb} = 24ºC, V_{LOG} = 24 VDC; V_{MOT} = 48VDC
- Supplies start-up / shutdown sequence: any
- Load current (sinusoidal amplitude) = 64A

Operating Conditions		Min.	Typ.	Max.	Units
Ambient temperature		0		+40	ºC
Ambient humidity	Non-condensing	0		90	%Rh
Altitude /pressure[1]	Altitude (vs. sea level)	-0.1	0 ÷ 2	2	km
	Ambient Pressure	0	0.75 ÷ 1	10.0	atm
Storage Conditions		**Min.**	**Typ.**	**Max.**	**Units**
Ambient temperature		-40		+85	ºC
Ambient humidity	Non-condensing	0		100	%Rh
Ambient Pressure		0		10.0	atm
Mechanical Mounting					
Mounted on heatsink	It is necessary to mount the iPOS4850 BX-CAN-STO on a metallic heatsink using the provided mounting holes. If the integrated internal thermal sensor exceeds 95ºC, the drive outputs turn off.				

Environmental Characteristics		Min.	Typ.	Max.	Units
Size (Length x Width x Height)	Without mating connectors	139 x 93.9 x 24.5			mm
		~5.47 x 3.7 x 0.96			inch
Weight	Without mating connectors	TBD			g
Power dissipation	Idle (no load)		3.6		W
	Operating	see theoretical chart			
Efficiency			98		%
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	24	36	V_{DC}
	Absolute maximum values, drive operating but outside guaranteed parameters		8	24	40	V_{DC}
	Absolute maximum values, surge (duration ≤ 10ms)[†]		-1		+45	V
Supply current	No enc. No Load on Digital Outputs	+V_{LOG} = 9V		190		mA
		+V_{LOG} = 12V		170		
		+V_{LOG} = 24V		110		
		+V_{LOG} = 36V		80		

Motor Supply Input (+V_{MOT})		Min.	Typ.	Max.	Units
Supply voltage	Nominal values	12	48	60	V_{DC}
	Absolute maximum values, drive operating but outside guaranteed parameters	11		70	V_{DC}
	Absolute maximum values, surge (duration ≤ 10ms)[†]	-1		75	V
Supply current	Idle		1	5	mA
	Operating	-50	±10	+50	A
	Absolute maximum value, short-circuit condition (Duration ≤ 10ms)[†]			100	A

Digital Inputs (IN2/LSP, IN3/LSN)			Min.	Typ.	Max.	Units
Mode compliance			PNP			
Default state	Input floating (wiring disconnected)		Logic LOW			
Input voltage	Logic "LOW"		-10	0	3.3	V
	Logic "HIGH"		6.7		36	
	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"	Vlog=24V		9.15		
		Vlog=36V		13.7		
Input frequency			0		150	kHz
Minimum pulse			3.3			µs
ESD protection	Human body model 0.1nF 1.5 kΩ		±1			kV

Operating temperature		Min.	Typ.	Max	Units
Ambient Temperature	Non condensing	0		40	°C
		Ambient temperature can exceed 40ºC if the internal temperature sensor measures less than 95ºC			

Motor Outputs (A/A+, B/A-, C)			Min.	Typ.	Max.	Units
Nominal current	Sinusoidal RMS [2]				45	A_{RMS}
	Sinusoidal RMS [3]				35.4	
	Sinusoidal amplitude [2]				64	A
	Sinusoidal amplitude [3]				50	
Peak current	maximum 13s with 6 AWG wires, external heatsink		-90		+90	A
Short-circuit protection threshold					±100	A
Short-circuit protection delay			5	10		µs
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} = 48 V	F_{PWM}				µH
		20 kHz	330			
		40 kHz	150			
		60 kHz	120			
	Minimum value, limited by short-circuit protection; +V_{MOT} = 48 V	20 kHz	120			µH
		40 kHz	40			
		60 kHz	30			
Motor electrical time-constant (L/R)	Recommended value for ±5% current measurement error	20 kHz	250			µs
		40 kHz	125			
		60 kHz	100			
Current measurement	FS = Full Scale accuracy			±5	±8	%FS

Digital Outputs (OUT2/Error, OUT3/Ready)			Min.	Typ.	Max.	Units
Mode compliance	All outputs (OUT2/Error, OUT3/Ready)		NPN 24V			
Default state	Not supplied (+V_{LOG} floating or to GND)		High-Z (floating)			
	Immediately after power-up	OUT2/Error, OUT3/Ready	Logic "LOW"			
	Normal operation	OUT2/Error	Logic "HIGH"			
		OUT3/Ready	Logic "LOW"			
Output voltage	Logic "LOW"; out current = 0.5A				0.8	V
	Logic "HIGH"; output current = 0, no load	OUT2/Error, OUT3/ Ready	2.9	3	3.3	
	Logic "HIGH", external load to +V_{LOG}			V_{LOG}		
	Absolute maximum, continuous		-0.5		V_{LOG}+0.5	
	Absolute maximum, surge (duration ≤ 1s)[†]		-1		V_{LOG}+1	
Output current	Logic "LOW", sink current, continuous, OUT2/Error, OUT3/Ready				0.5	A
	Logic "HIGH", source current; external load to GND; V_{OUT} >= 2.0V	OUT2/Error, OUT3/ Ready			2	mA
	Logic "HIGH", leakage current; external load to +V_{LOG}; V_{OUT} = V_{LOG} max = 40V			0.1	0.2	mA
Minimum pulse width			2			µs
ESD protection	Human body model		±15			kV

Digital Hall Inputs (Hall1+, Hall1-, Hall2+, Hall2-, Hall3+, Hall3-)[4]			Min.	Typ.	Max.	Units
Mode compliance	TTL / CMOS / Open-collector					
Default state	Input floating (Wiring disconnected)		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
Differential mode compliance	RS422 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				120		Ω
Input frequency	Differential mode		0		10	MHz
Minimum pulse width	Differential mode		50			ns
ESD protection	Human body model		±5			kV

[1] iPOS4850 BX-CAN 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.
[2] With adequate thermal heat sink
[3] No thermal heat sink (worst case scenario)

[4] All differential Hall input pins have internal 120Ω termination resistors connected across if SW1 pin 7 is put on "ON" position

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Encoder Inputs (A1+, A1-, B1+, B1-, Z1+, Z1-, A2+, A2-, B2+, B2-, Z2+, Z2-)		Min.	Typ.	Max	Units
Single-ended mode compliance	Leave negative inputs disconnected	TTL / CMOS / Open-collector			
Input voltage, single-ended mode A/A+, B/B+	Logic "LOW"			1.6	V
	Logic "HIGH"	1.8			
	Floating voltage (not connected)		3.3		
Input voltage, single-ended mode Z/Z+	Logic "LOW"			1.2	V
	Logic "HIGH"	1.4			
	Floating voltage (not connected)		4.7		
Input current, single-ended mode A/A+, B/B+, Z/Z+	Logic "LOW"; Pull to GND		5.5	6	mA
	Logic "HIGH"; Internal 2.2KΩ pull-up to +5	0	0	0	
Differential mode compliance	For full RS422 compliance, see SW1 settings (pin 8 and 9)	TIA/EIA-422-A			
Input voltage, differential mode	Hysteresis	±0.06	±0.1	±0.2	V
	Common-mode range (A+ to GND, etc.)	-7		+7	
Input impedance, differential	A1+ to A1-, B1+ to B1-		1		kΩ
	Z1+ to Z1-		1		
Input frequency	Single-ended mode, Open-collector / NPN	0		5	MHz
	Differential mode, or Single-ended driven by push-pull (TTL / CMOS)	0		10	MHz
Minimum pulse width	Single-ended mode, Open-collector / NPN	1			µs
	Differential mode, or Single-ended driven by push-pull (TTL / CMOS)	50			ns
Input voltage, any pin to GND	Absolute maximum values, continuous	-7		+7	V
	Absolute maximum, surge (duration ≤ 1s) †	-11		+14	
ESD protection	Human body model	±1			kV

Absolute Encoder Interface: SSI, BISS-C, EnDAT		Min	Typ.	Max.	Units
Differential mode (CLOCK, DATA)	For full RS422 compliance, see SW1 settings	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, 4000			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				

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)				

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		14.7		kΩ
Resolution			12		bits
Integral linearity				±2	bits
Offset error			±2	±10	bits
Gain error			±1%	±3%	% FS[1]
Bandwidth (-3dB)	Software selectable	0		1	kHz
ESD protection	Human body model	±2			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

CAN-Bus		Min.	Typ.	Max.	Units
Compliance	ISO11898, CiA-301v4.2 & 402v3.0				
Bit rate	Software selectable	125		1000	Kbps
Bus length	1Mbps			25	m
	500Kbps			100	
	≤ 250Kbps			250	
Resistor	Between CAN-Hi, CAN-Lo	none on-board			
Node addressing	by hardware through SW1	1 ÷ 31; 255 (all bits 0)			-
	by software using EasySetUp	1-255			
ESD protection	Human body model	±15			kV

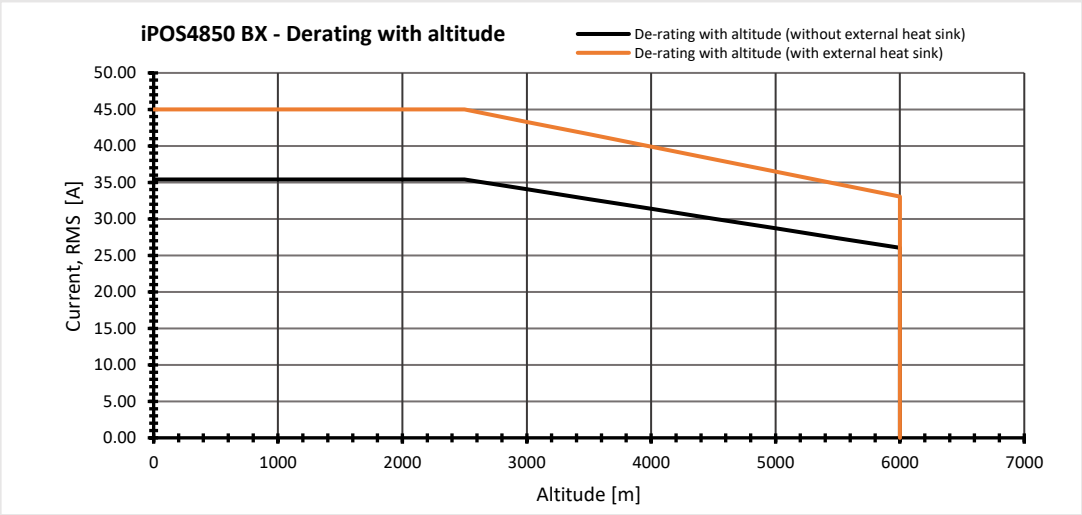
Remark: *If AxisID = 255 in CANopen, the drive will be in "LSS inactive" state and the Green LED will flash at 1 second intervals*

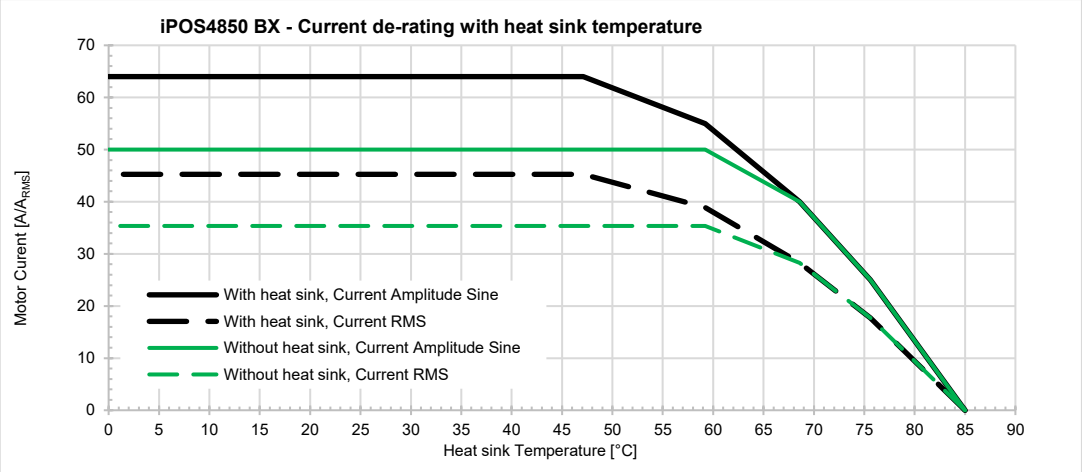
Solenoid Driver (OUT0/Brake)			Min.	Typ.	Max.	Units
Brake+/Brake-: solenoid driver, 2A, overcurrent protected (Brake+ connected internally to +Vlog). Current flows into solenoid from Brake+ to Brake-; commanded by OUT0 digital output						
Default state	Not supplied ($+V_{LOG}$ floating or to GND)		High-Z (floating)			
	Immediately after power-up	Brake-	High-Z (floating)			
	Normal operation	Brake-	High-Z (floating)			
Output voltage	Logic "LOW" (Brake-)				0.2	V
	Logic "HIGH"; load present			$+V_{log}$		
	Logic "HIGH", no load present			+5V		
	Absolute maximum, continuous		-0.5		55	
Output current	Logic "LOW", sink current, continuous, Brake-				2	A
	Logic "HIGH", leakage current; external load to $+V_{LOG}$; $V_{OUT} = V_{LOG}$ max = 55V				0.2	mA

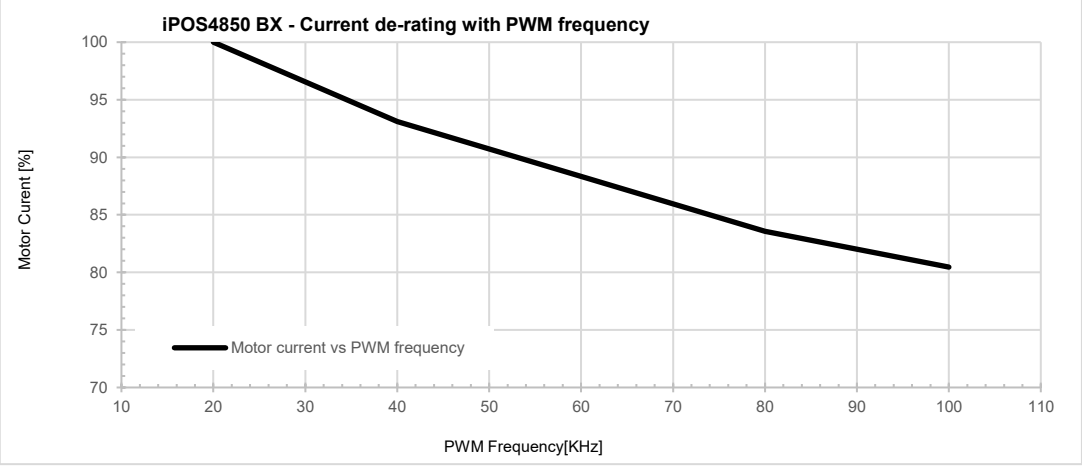
Supply Output (+5V)		Min.	Typ.	Max	Units
Output voltage	Current sourced = 500mA	4.8	5	5.2	V
Output current				450	mA
Short-circuit		protected			
Over-voltage		NOT protected			
ESD protection	Human body model 0.1nF 1.5 kΩ	±2			kV

† 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"


iPOS4850 BX - Derating with altitude
De-rating with altitude (without external heat sink)
De-rating with altitude (with external heat sink)
Current, RMS [A]
50.00
45.00
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
0
1000
2000
3000
4000
5000
6000
7000
Altitude [m]


iPOS4850 BX - Current de-rating with heat sink temperature
Motor Curent [A/ARMS]
70
60
50
40
30
20
10
0
With heat sink, Current Amplitude Sine
With heat sink, Current RMS
Without heat sink, Current Amplitude Sine
Without heat sink, Current RMS
0
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
Heat sink Temperature [°C]


iPOS4850 BX - Current de-rating with PWM frequency
Motor Curent [%]
100
95
90
85
80
75
70
Motor current vs PWM frequency
10
20
30
40
50
60
70
80
90
100
110
PWM Frequency[KHz]