

All dimensions are expressed in mm.

Motor – sensor configurations						
Sensor \ Motor	PMSM	BLDC	DC BRUSH	STEP (2-ph)	STEP (3-ph)	
Incr. Encoder	Ⓣ		Ⓣ	Ⓣ		
Incr. Encoder + Hall	Ⓣ	Ⓣ				
Analog Sin/Cos encoder	Ⓣ					
Linear Halls	Ⓣ					
Tacho			Ⓣ			
Open-loop (no sensor)				Ⓣ	Ⓣ	

- Features**
- Motor supply: 9-36V; Logic supply 9-36V
 - Output current:
 - iPOS3602: 2 A cont. (BLDC mode), 3.2 A_{PEAK}
 - iPOS3604: 4 A cont. (BLDC mode), 10 A_{PEAK}
 - 4 x Digital Hall sensor interface (single-ended and open collector)
 - 4 x Incremental encoder interface (differential)
 - 4 x Linear Hall sensors interface
 - 4 x Analogue sin/cos encoder interface (differential 1V_{pp})
 - 4 x 5 digital inputs, 5-36V, NPN: Enable, 2 for limit switches, 2 general-purpose
 - 4 x 4 digital outputs, 5-36V, 0.5A, NPN O.C.: Ready, Error, 2 general-purpose
 - 4 x 2 analogue inputs: 12-bit, 0-5V: Reference, Feedback or general purpose
 - 1 x RS-232 serial interface for board #1
 - 3 possible hardware address ranges for the 4 axes: 1-4, 22-25 or 43-46, selectable via jumper 2
 - Operating ambient temperature: 0-40°C

- Communication:
 - CAN-bus protocols: CANopen (CiA301v4.2, DSP305v2.2, DSP402v3.0) or Technosoft's TMLCAN, selectable via a jumper
 - CAN-bus up to 1Mb/s, RS-232 up to 115k
 - Ethernet 100Mb/s using the Ethernet plug-in interface*

Mating connectors			
Connector	Producer	Part No.	Description
J122, J121, J120	MOLEX	0430250400	RECEPTACLE, FREE, 4WAY, CRIMP
J119, J116, J113, J110	MOLEX	0430251400	RECEPTACLE, FREE, 14WAY
J117, J114, J111, J107, J108	MOLEX	0430251000	RECEPTACLE, FREE, 10WAY
J118, J115, J112, J109	MOLEX	51110-1056	HOUSING CONNECTOR 2x5 MILLIGRID
J122, J121, J120, J119, J116, J113, J110, J117, J114, J111, J107, J108	MOLEX	43030 0007	CRIMP SOCKET, PK100, 20AWG
J118, J115, J112, J109	MOLEX	50394-8051	CRIMP PIN MILLIGRID 26-30AWG
J105*	-	-	Standard 8P8C CAT 5 modular jack (RJ-45) plug

Connector Description			
Pin	Name	Type	Description
J107	1..4	+V _{MOT}	Positive terminals of the motor supply for all 4 boards: 9 to 36V _{dc}
	5	+V _{Log}	Positive terminal of the logic supply for all 4 boards: 9 to 36V _{dc}
	6..10	GND	Negative return (ground) of the power supply

Pin	Name	Type	Description
J120	1	232TX	O RS-232 Data Transmission for Drive #1..6
	2	n.c.	- Not connected
	3	232RX	I RS-232 Data Reception for Drive #1..6
	4	GND	- Return ground for RS-232 pins

Pin	Name	Type	Description
J122, J121	1	+Vlog	O RS-232 Data Transmission for Drive #1..6
	2	GND	- Return ground for CAN pins
	3	CAN-Hi	I/O CAN-bus positive line (positive during dominant bit)
	4	CAN-Lo	I/O CAN-bus negative line (negative during dominant bit)

Pin	Name	Type	Description
J110, J113, J116, J119	1	+5V _{OUT}	O 5V output supply - internally generated by each iPOS
	2	REF	I Analogue input, 12-bit, 0-5V. Used to read an analog position, speed or torque reference, or used as general purpose analogue input
	3	IN0	I 5-36V general-purpose digital NPN input
	4	IN4/Enable	I 5-36V digital NPN input. Drive enable input
	5	IN3/LSN	I 5-36V digital NPN input. Negative limit switch input
	6	OUT2/Error	O 5-36V 0.5A, drive Error output, active low, NPN open-collector/TTL pull-up. Connected also to the red LED
	7	+V _{Log}	I/O Positive terminal of the logic supply: 9 to 36V _{DC}
	8	GND	- Return ground for I/O pins
	9	FDBK	I Analogue input, 12-bit, 0-5V. Used to read an analogue position or speed feedback (as tach), or used as general purpose analogue input
	10	IN1	I 5-36V general-purpose digital NPN input
	11	IN2/LSP	I 5-36V digital NPN input. Positive limit switch input
	12	OUT0	O 5-36V 0.5A, general-purpose digital output, NPN open-collector/TTL pull-up
	13	OUT3/Ready	O 5-36V 0.5A, drive Ready output, active low, NPN open-collector/TTL pull-up. Connected also to the green LED
	14	OUT1	O 5-36V 0.5A, general-purpose digital output, NPN open-collector/TTL pull-up

Pin	Name	Type	Description
J108, J111, J114, J117	1	A/A+	O Phase A for 3-ph motors, A+ for 2-ph steppers, Motor+ for DC brush motors
	2	C/B+	O Phase C for 3-ph motors, B+ for 2-ph steppers
	3	Hall 1	I Digital input Hall 1 sensor
	4	Hall 2	I Digital input Hall 2 sensor
	5	Hall 3	I Digital input Hall 3 sensor
	6	B/A-	O Phase B for 3-ph motors, A- for 2-ph steppers, Motor- for DC brush motors
	7	BR/B-	O Brake resistor / Phase B- for step motors
	8	+5V _{OUT}	O 5V output supply - internally generated by each iPOS
	9	GND	- Negative return (ground) of the motor supply
	10	GND	- Negative return (ground) of the motor supply

Pin	Name	Type	Description
J109, J112, J115, J118	1	GND	- Return ground for sensors supply
	2	+5V _{OUT}	O 5V output supply for I/O usage
	3	n.c. / GND	- Not connected. If AvagoTech differential quad encoders are used, connect pin to GND via solder joints on board back side near each feedback connector
	4	+5V _{OUT}	O 5V output supply for I/O usage generated by the iPOS board
	5	A- /Sin-/LH1	I Incr. encoder A- diff. input, or analogue encoder Sin- diff. input, or linear Hall 1 input
	6	A+/Sin+	I Incr. encoder A+ diff. input, or analogue encoder Sin+ diff. input
	7	B-/Cos-/LH2	I Incr. encoder B- diff. input, or analogue encoder Cos- diff. input, or linear Hall 2 input
	8	B+/Cos+	I Incr. encoder B+ diff. input, or analogue encoder Cos+ diff. input
	9	Z- /LH3	I Incr. encoder (index) Z- diff. input, or linear Hall 3 input
	10	Z+	I Incr. encoder (index) Z+ diff. input

LED	Name	Color	Description
LED1	+Log	Green	+Vlog power presence
LED2*	ENET L	Green	Ethernet Link OK
LED3*	ENET A	Green	Ethernet Activity

Jumper settings

JP1 ON: Connect a CAN terminator (120Ω resistor)

CAN protocol	JP3	JP2	Axis ID iPOS #1	Axis ID iPOS #2	Axis ID iPOS #3	Axis ID iPOS #4
CANopen	ON	1-2	1	2	3	4
CANopen	ON	OFF	22	23	24	25
CANopen	ON	2-3	43	44	45	46
TMLCAN	OFF	1-2	1	2	3	4
TMLCAN	OFF	OFF	22	23	24	25
TMLCAN	OFF	2-3	43	44	45	46

Electrical characteristics

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

- Tamb = 0...40°C, +Vlog supply = 24.0V DC
- The Ethernet port active, all iPOS360x and E-CAT VX adapters plugged in


Operating Conditions		Min.	Typ.	Max.	Units
Ambient temperature		0		+60	°C
Ambient humidity	Non-condensing	0		90	% Rh
Altitude / pressure	Altitude (vs. sea level)	-0.1		2.5	Km
	Ambient Pressure	0.75		10.0	atm
Storage Conditions		Min.	Typ.	Max.	Units
Ambient temperature		-40		+85	°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			
Insertion force	J101..J104 (iPOS360x)		20	36	N
	J100 (E-NET VX)		11	22	
Extraction force	J101..J104 (iPOS360x)	5	10		
	J100 (E-NET VX)	3	7		N
Environmental Characteristics		Min.	Typ.	Max.	Units
Size (Length x Width x Height)	Without mating connector	98 x 100.3 x 21.2			mm
		~3.86 x 3.95 x 0.84			inch
Weight		200			g
Power dissipation	Operating		10	24	W
Cleaning agents	Dry cleaning is recommended	Only Water- or Alcohol- based			
Protection degree	According to IEC60529, UL508	IP00			-

Supply Input		Min.	Typ.	Max.	Units
Logic Supply voltage	Operating	9	24	36	V _{DC}
	Absolute maximum values, continuous [†]	7		39	
Motor Supply voltage	Operating	9	24	36	V _{DC}
	Absolute maximum values, continuous [†]	8.5		40	
Logic supply current	No Load on Digital Outputs	+V _{Log} = 12V		420	mA
		+V _{Log} = 24V		250	
		+V _{Log} = 36V		200	
Motor supply current	Idle		10	40	mA
	Operating	-40		40	

Ethernet Ports*		Min.	Typ.	Max.	Units
		Fast Ethernet 10BASE-T/100BASE-TX (IEEE802.3)			
Power over Ethernet	NOT used by ENET-VX, separate logic supply	compliant to IEEE802.3af mode A "Mixed DC & Data"			
		NOT compliant to IEEE802.3af mode B "DC on Spares"			
ESD protection	Human body model	±4			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.

***Remark:** The board with the part number P028.002.E884 does not have the connectors J100, J105 and LEDs 2, 3 mounted. These connectors are present on the iPOS360x MBX-NET motherboard with the part number P028.002.E894.

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