

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
  - 6 x Digital Hall sensor interface (single-ended and open collector)
  - 6 x Incremental encoder interface (differential)
  - 6 x Linear Hall sensors interface
  - 6 x Analogue sin/cos encoder interface (differential 1V<sub>pp</sub>)
  - 6 x 5 digital inputs, 5-36V, NPN: Enable, 2 for limit switches and 2 general-purpose
  - 6 x 4 digital outputs, 5-36V, 0.5A, NPN O.C.: Ready, Error and 2 general-purpose
  - 6 x 2 analogue inputs: 12-bit, 0-5V: Reference, Feedback or general purpose
  - 6 x RS-232 serial interface
  - CAN-bus protocols: CANOpen (CiA301v4.2, DSP402v3.0) or Technosoft's TMLCAN, selectable via a sliding switch
  - CAN-bus up to 1Mb/s, RS-232 up to 115k
  - Operating ambient temperature: 0-40°C

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Mating Connector				
Connector	Producer	Part No.	Description	Wire Gauge
J41-46, J105, J106	MOLEX	43025-0400	MICROFIT RECEPTACLE HOUSING, 2x2 WAY	AWG 20...24
J51-56, J107	MOLEX	43025-1400	MICROFIT RECEPTACLE HOUSING, 2x7 WAY	AWG 20..24
J61-66, J101	MOLEX	43025-1000	MICROFIT RECEPTACLE HOUSING, 2x5 WAY	AWG 20..24
J101, J107, J5x, J4x, J105, J106	MOLEX	43030-0007	CRIMP PIN, MICROFIT, 5A	AWG 20..24
J21-26	MOLEX	90142-0010	C-Grid III™ Crimp Housing Dual Row, 10 Circuits, with retention	AWG 22..24
		90143-0010	C-Grid III™ Crimp Housing Dual Row, 10 Circuits, without retention	
J21-26	MOLEX	90119-0109	CRIMP PIN, C-Grid III	AWG 22..24

### Connector Description

Pin	Name	Type	Description
J101	1..4	+V <sub>MOT</sub>	I Positive terminals of the motor supply for all 6 boards: 9 to 36V <sub>DC</sub> .
	5	+V <sub>LOG</sub>	I Positive terminal of the logic supply for all 6 boards: 9 to 36V <sub>DC</sub> .
	6..10	GND	- Negative return (ground) of the power supply

Pin	Name	Type	Description
J41-46	1	232TX	O RS-232 Data Transmission for Drive #1...6
	2	GND	- Return ground for RS-232 pins
	3	232RX	I RS-232 Data Reception for Drive #1...6
	4	GND	- Return ground for RS-232 pins


Pin	Name	Type	Description
J51-56; where 1...6 is the drive number	1	+5V <sub>OUT</sub>	O 5V output supply for I/O usage
	2	REF	I Analogue input, 12-bit, 0-5V. Used to read an analogue 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. Also drives the red LED
	7	+V <sub>LOG</sub>	I/O Positive terminal of the logic supply: 9 to 36V <sub>DC</sub> / Internally connected to J101 pin 5
	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 tacho), 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. Also drives the green LED.
	14	OUT1	O 5-36V 0.5A, general-purpose digital output, NPN open-collector/TTL pull-up

Pin	Name	Type	Description
1	GND	-	Return ground for I/O pins
2	#1 IN3/LSN	I	5-36V digital NPN input. Negative limit switch input for Drive #1. Alternative to J51 pin 5
3	#2 IN3/LSN	I	5-36V digital NPN input. Negative limit switch input for Drive #2. Alternative to J52 pin 5
4	#3 IN3/LSN	I	5-36V digital NPN input. Negative limit switch input for Drive #3. Alternative to J53 pin 5
5	#4 IN3/LSN	I	5-36V digital NPN input. Negative limit switch input for Drive #4. Alternative to J54 pin 5
6	#5 IN3/LSN	I	5-36V digital NPN input. Negative limit switch input for Drive #5. Alternative to J55 pin 5
7	#6 IN3/LSN	I	5-36V digital NPN input. Negative limit switch input for Drive #6. Alternative to J56 pin 5
J107	8	+V <sub>LOG</sub>	I/O Positive terminal of the logic supply: 9 to 36V <sub>DC</sub> / Internally connected to J101 pin 5
	9	#1 IN2/LSP	I 5-36V digital NPN input. Positive limit switch input for Drive #1. Alternative to J51 pin 11
	10	#2 IN2/LSP	I 5-36V digital NPN input. Positive limit switch input for Drive #2. Alternative to J52 pin 11
	11	#3 IN2/LSP	I 5-36V digital NPN input. Positive limit switch input for Drive #3. Alternative to J53 pin 11
	12	#4 IN2/LSP	I 5-36V digital NPN input. Positive limit switch input for Drive #4. Alternative to J54 pin 11
	13	#5 IN2/LSP	I 5-36V digital NPN input. Positive limit switch input for Drive #5. Alternative to J55 pin 11
	14	#6 IN2/LSP	I 5-36V digital NPN input. Positive limit switch input for Drive #6. Alternative to J56 pin 11

Pin	Name	Type	Description
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	CR/B-	O	Chopping Resistor / Phase B- for step motors
8	+5V <sub>OUT</sub>	O	5V output supply - internally generated
9	GND	-	Negative return (ground) of the motor supply
10	GND	-	Negative return (ground) of the motor supply

Pin	Name	Type	Description	
J61-66; where 1...6 is the drive number	1	Z- /LH3	I Incr. encoder (index) Z- diff. input, or linear Hall 3 input	
	2	Z+	I Incr. encoder (index) Z+ diff. input	
	3	B-/Cos-/LH2	I Incr. encoder B- diff. input, or analogue encoder Cos- diff. input, or linear Hall 2 input	
	4	B+/Cos+	I Incr. encoder B+ diff. input, or analogue encoder Cos+ diff. input	
	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	GND	-	Return ground for sensors supply
	8	+5V <sub>OUT</sub>	O	5V output supply for I/O usage
	9	GND	-	Return ground for sensors supply
	10	+5V <sub>OUT</sub>	O	5V output supply for I/O usage

Pin	Name	Type	Description
J21-26; where 1...6 is the drive number	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)

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## Jumper settings

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

SW1 sliding switch settings for TMLCAN										
SW1 sliding switch						Axis ID (iPOS#1...#6)				
1	2	3	4	5	6					
-	-	-	-	-	-	22	...	27		
-	-	-	-	-	on	29	...	34		
-	-	-	-	on	-	36	...	41		
-	-	-	-	on	on	43	...	48		
-	-	-	on	-	-	1	...	6		
-	-	-	on	-	on	8	...	13		
-	-	-	on	on	-	15	...	20		
-	-	-	on	on	on	22	...	27		
-	-	on	-	-	-	71	...	76		
-	-	on	-	-	on	78	...	83		
-	-	on	-	on	-	85	...	90		
-	-	on	-	on	on	92	...	97		
-	-	on	on	-	-	50	...	55		
-	-	on	on	-	on	57	...	62		
-	-	on	on	on	-	64	...	69		
-	-	on	on	on	on	71	...	76		
-	on	-	-	-	-	120	...	125		
-	on	-	-	-	on	127	...	132		
-	on	-	-	on	-	134	...	139		
-	on	-	-	on	on	141	...	146		
-	on	-	on	-	-	99	...	104		
-	on	-	on	-	on	106	...	111		
-	on	-	on	on	-	113	...	118		
-	on	-	on	on	on	120	...	125		
-	on	on	-	-	-	169	...	174		
-	on	on	-	-	on	176	...	181		
-	on	on	-	on	-	183	...	188		
-	on	on	-	on	on	190	...	195		
-	on	on	on	-	-	148	...	153		
-	on	on	on	-	on	155	...	160		
-	on	on	on	on	-	162	...	167		
-	on	on	on	on	on	169	...	174		
on	-	-	-	-	-	22	...	27		
on	-	-	-	-	on	29	...	34		
on	-	-	-	on	-	36	...	41		
on	-	-	-	on	on	43	...	48		
on	-	-	on	-	-	1	...	6		
on	-	-	on	-	on	8	...	13		
on	-	-	on	on	-	15	...	20		
on	-	-	on	on	on	22	...	27		
on	-	on	-	-	-	71	...	76		
on	-	on	-	-	on	78	...	83		
on	-	on	-	on	-	85	...	90		
on	-	on	-	on	on	92	...	97		
on	-	on	on	-	-	50	...	55		
on	-	on	on	-	on	57	...	62		
on	-	on	on	on	-	64	...	69		
on	-	on	on	on	on	71	...	76		
on	on	-	-	-	-	120	...	125		
on	on	-	-	-	on	127	...	132		
on	on	-	-	on	-	134	...	139		
on	on	-	-	on	on	141	...	146		
on	on	-	on	-	-	99	...	104		
on	on	-	on	-	on	106	...	111		
on	on	-	on	on	-	113	...	118		
on	on	-	on	on	on	120	...	125		
on	on	on	-	-	-	169	...	174		
on	on	on	-	-	on	176	...	181		
on	on	on	-	on	-	183	...	188		
on	on	on	-	on	on	190	...	195		
on	on	on	on	-	-	148	...	153		
on	on	on	on	-	on	155	...	160		
on	on	on	on	on	-	162	...	167		
on	on	on	on	on	on	169	...	174		
on	on	on	on	on	on	22	...	27		
on	on	on	on	on	on	29	...	34		
on	on	on	on	on	on	36	...	41		
on	on	on	on	on	on	43	...	48		
on	on	on	on	on	on	1	...	6		
on	on	on	on	on	on	8	...	13		
on	on	on	on	on	on	15	...	20		
on	on	on	on	on	on	22	...	27		
on	on	on	on	on	on	71	...	76		
on	on	on	on	on	on	78	...	83		
on	on	on	on	on	on	85	...	90		
on	on	on	on	on	on	92	...	97		
on	on	on	on	on	on	50	...	55		
on	on	on	on	on	on	57	...	62		
on	on	on	on	on	on	64	...	69		
on	on	on	on	on	on	71	...	76		
on	on	on	on	on	on	120	...	125		
on	on	on	on	on	on	127	...	132		
on	on	on	on	on	on	134	...	139		
on	on	on	on	on	on	141	...	146		
on	on	on	on	on	on	99	...	104		
on	on	on	on	on	on	106	...	111		
on	on	on	on	on	on	113	...	118		
on	on	on	on	on	on	120	...	125		
on	on	on	on	on	on	169	...	174		
on	on	on	on	on	on	176	...	181		
on	on	on	on	on	on	183	...	188		
on	on	on	on	on	on	190	...	195		
on	on	on	on	on	on	148	...	153		
on	on	on	on	on	on	155	...	160		
on	on	on	on	on	on	162	...	167		
on	on	on	on	on	on	169	...	174		
on	on	on	on	on	on	22	...	27		
on	on	on	on	on	on	29	...	34		
on	on	on	on	on	on	36	...	41		
on	on	on	on	on	on	43	...	48		
on	on	on	on	on	on	1	...	6		
on	on	on	on	on	on	8	...	13		
on	on	on	on	on	on	15	...	20		
on	on	on	on	on	on	22	...	27		

SW1 sliding switch settings for CANopen										
SW1 sliding switch						Axis ID (iPOS#1...#6)				
1	2	3	4	5	6					
on	-	-	-	-	-	22	...	27		
on	-	-	-	-	on	29	...	34		
on	-	-	-	on	-	36	...	41		
on	-	-	-	on	on	43	...	48		
on	-	-	on	-	-	1	...	6		
on	-	-	on	-	on	8	...	13		
on	-	-	on	on	-	15	...	20		
on	-	-	on	on	on	22	...	27		
on	-	on	-	-	-	71	...	76		
on	-	on	-	-	on	78	...	83		
on	-	on	-	on	-	85	...	90		
on	-	on	-	on	on	92	...	97		
on	-	on	on	-	-	50	...	55		
on	-	on	on	-	on	57	...	62		
on	-	on	on	on	-	64	...	69		
on	-	on	on	on	on	71	...	76		
on	on	-	-	-	-	120	...	125		
on	on	-	-	-	on	127	...	132		
on	on	-	-	on	-	134	...	139		
on	on	-	-	on	on	141	...	146		
on	on	-	on	-	-	99	...	104		
on	on	-	on	-	on	106	...	111		
on	on	-	on	on	-	113	...	118		
on	on	-	on	on	on	120	...	125		
on	on	on	-	-	-	169	...	174		
on	on	on	-	-	on	176	...	181		
on	on	on	-	on	-	183	...	188		
on	on	on	-	on	on	190	...	195		
on	on	on	on	-	-	148	...	153		
on	on	on	on	-	on	155	...	160		
on	on	on	on	on	-	162	...	167		
on	on	on	on	on	on	169	...	174		
on	on	on	on	on	on	22	...	27		
on	on	on	on	on	on	29	...	34		
on	on	on	on	on	on	36	...	41		
on	on	on	on	on	on	43	...	48		
on	on	on	on	on	on	1	...	6		
on	on	on	on	on	on	8	...	13		
on	on	on	on	on	on	15	...	20		
on	on	on	on	on	on	22	...	27		

## Electrical characteristics

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

- Tamb = 0...40°C, +Vlog supply = 24.0V DC

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-CAT VX)		11	22	
Extraction force	J101...J104 (iPOS360x)	5	10		
	J100 (E-CAT VX)	3	7		N
Environmental Characteristics		Min.	Typ.	Max.	Units
Size (Length x Width x Height)		160 x 122 x 37			mm
		~6.29 x 4.72 x 1.45			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 <sub>DC</sub>
	Absolute maximum values, continuous <sup>†</sup>	7		39	
Motor Supply voltage	Operating	9	24	36	V <sub>DC</sub>
	Absolute maximum values, continuous <sup>†</sup>	8.5		40	
Logic supply current	No Load on Digital Outputs <sup>1</sup>	+V <sub>LOG</sub> = 12V	420	924	mA
		+V <sub>LOG</sub> = 24V	250	550	
		+V <sub>LOG</sub> = 36V	200	440	
Motor supply current	Idle		10	40	mA
	Operating	-40		40	

<sup>1</sup> The same minimum inductance values remain, as in iPOS3604. There are no additional inductors on the iPOS360x MBX6-CAN board.

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