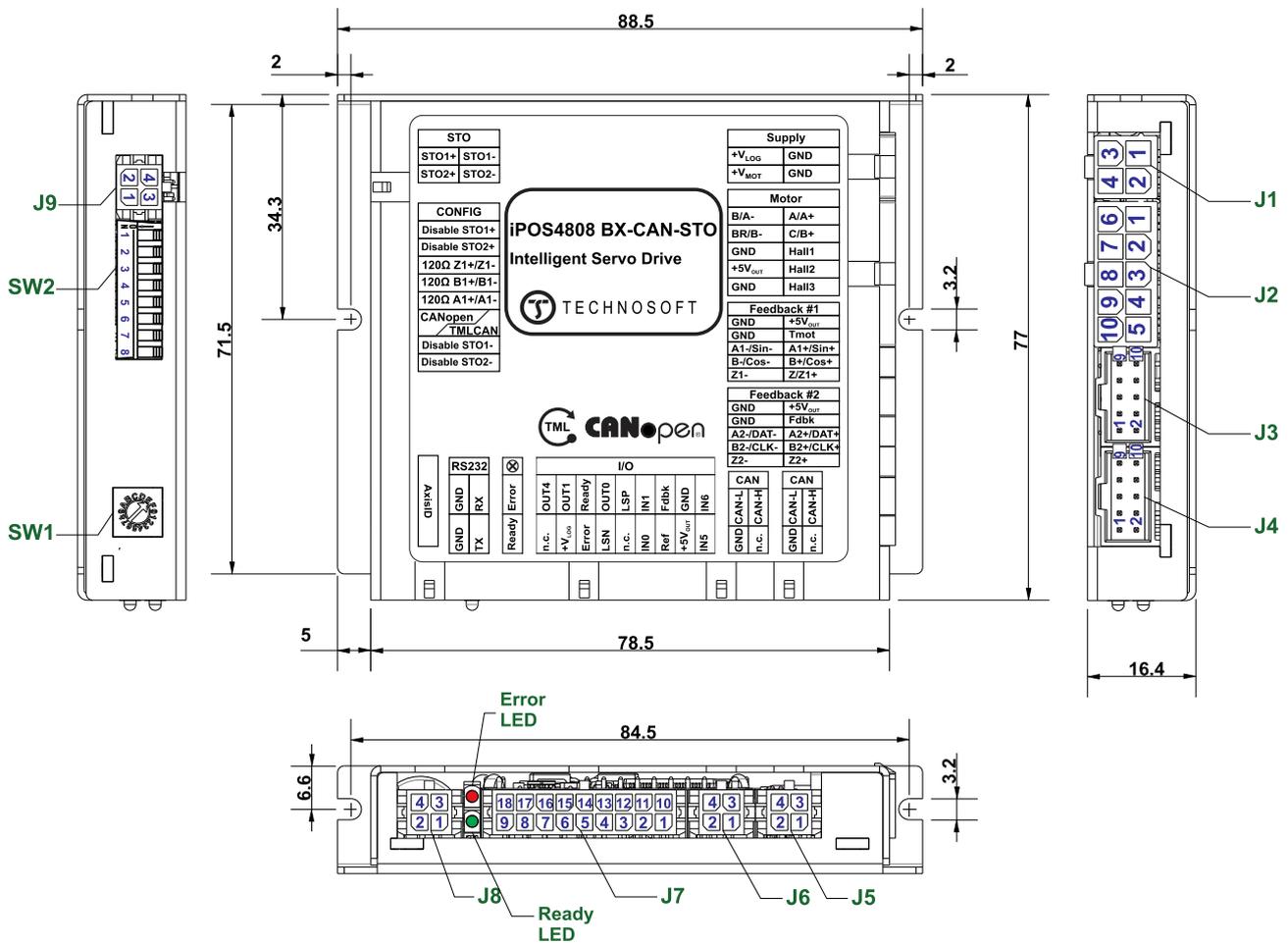


# iPOS4808 BX-CAN-STO DATASHEET

P/N: P027.314.E201



All dimensions are in mm; Drawing not to scale.

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

\*optional, please ask Technosoft for details

### Features

- Motion controller and drive in a single compact unit based on MotionChip™ technology
- Universal solution for control of rotary and linear brushless, brushed and 2 or 3-phase step motors
- Advanced motion control capabilities (PVT,S-curve, electronic cam)
- Motor supply: 11-50V. Logic supply: 9-36V
- Output current: 8A cont. (BLDC mode); 20A<sub>PEAK</sub>, up to 100KHz PWM
- STO: 2 safe torque-off inputs, safety integrity level (SIL3/Cat3/PLe) acc. to EN61800-5-1;-2/ EN61508-3;-4/ EN ISO 13849-1.

### Feedback Devices (dual-loop support)

#### 1<sup>st</sup> feedback devices supported:

- Incremental encoder interface (single ended or differential)
- pulse & direction interface (single ended) for external (master) digital reference
- Analogue sin/cos encoder interface (differential 1V<sub>pp</sub>)
- Digital Hall sensor interface (single-ended and open collector)

#### 2<sup>nd</sup> feedback devices supported:

- Incremental encoder interface (differential)
- pulse & direction interface (differential) for external (master) digital reference
- BiSS / SSI encoder interface

- 6 digital inputs, 12-36V, PNP/NPN programmable: 2 for limit switches, 4 general-purpose

- 5 digital outputs, 5-36V, 0.5A, NPN open-collector: Ready, Error, 3 general-purpose

- 2 analogue inputs: 12-bit, 0-5V: Reference, Feedback or general purpose

- RS-232 serial & CAN-bus 2.0B interfaces

- 16 h/w addresses selectable by h/w rotative hex switch
- TMLCAN and CANopen (CIA 301v4.2 and 402v3.0) protocols selectable by h/w switch

- 16k x 16 SRAM memory for data acquisition

- 16k x 16 E<sup>2</sup>ROM to store setup data, TML motion programs, cam tables and other user data

- Operating ambient temperature: 0-40°C (over 40°C with derating)

- NTC/PTC analogue Motor Temperature sensor input

- Firmware: F514+

|            |                                 |  |   |              |
|------------|---------------------------------|--|---|--------------|
| Name<br>EP | First edition<br>March 21, 2019 | Document template: P099.TQT.564.0001                                   | Last edition<br>March 21, 2019              | Visa :       |
|            |                                 | Title of document<br><b>iPOS4808 BX-CAN-STO<br/>PRODUCT DATA SHEET</b> | N° document<br><b>P027.314.E201.DSH.10B</b> | Page: 1 of 5 |

# iPOS4808 BX-CAN-STO DATASHEET

## P/N: P027.314.E201

### Mating Connectors

| Producer | Part No.   | Connector          | Description  | Wire Gauge |
|----------|------------|--------------------|--|------------|
| MOLEX    | 39-03-9042 | J1                 | MINIFIT JR. receptacle housing, 2x2 way                            | AWG 18-20  |
| MOLEX    | 39-03-9102 | J2                 | MINIFIT JR. receptacle housing, 2x5 way                            | AWG 18-20  |
| MOLEX    | 45750-1111 | J1, J2             | CRIMP PIN, MINIFIT JR., 13A  | AWG 18-20  |
| MOLEX    | 90142-0010 | J3, J4             | 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 |            |
| MOLEX    | 90119-0109 | J3, J4             | C-Grid III™ Crimp Terminal   | AWG 22..24 |
| MOLEX    | 43025-1800 | J7                 | MICROFIT RECEPTACLE HOUSING, 2x9 WAY                               | AWG 20..24 |
| MOLEX    | 43025-0400 | J5, J6, J8, J9     | MICROFIT RECEPTACLE HOUSING, 2x2 WAY                               | AWG 20..24 |
| MOLEX    | 43030-0007 | J5, J6, J7, J8, J9 | CRIMP PIN, MICROFIT, 5A  | AWG 20..24 |

### Connectors Description

| Pin  | Name              | Type | Description   |
|------|-------------------|------|---|
| 1    | GND               | -    | Negative return (ground) of the power supply                        |
| 2    | GND               | -    | Negative return (ground) of the power supply                        |
| J1 3 | +V <sub>LOG</sub> | I    | Positive terminal of the logic supply input: 9 to 36V <sub>DC</sub> |
| 4    | +V <sub>MOT</sub> | I    | Positive terminal of the motor supply: 11 to 50V <sub>DC</sub>      |

| 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   |
| J2 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    | GND                | -    | Negative return (ground) of the motor supply                              |
| 9    | +5V <sub>OUT</sub> | O    | 5V output supply - internally generated                                   |
| 10   | GND                | -    | Negative return (ground) of the motor supply                              |

| Pin  | Name               | Type | Description  |
|------|--------------------|------|--|
| 1    | Z1-                | I    | Incr. encoder1 Z- diff. input  |
| 2    | Z1+                | I    | Incr. encoder1 Z single-ended, or Z+ diff. input   |
| 3    | B1-/Cos-           | I    | Incr. encoder1 B- diff. input, or analogue encoder Cos- diff. input                              |
| 4    | B1+/Cos+/Dir       | I    | Incr. encoder1 B single-ended, or B+ diff. input, or Dir, or analogue encoder Cos+ diff. input   |
| J3 5 | A1-/Sin-           | I    | Incr. encoder1 A- diff. input, or analogue encoder Sin- diff. input                              |
| 6    | A1+/Sin+/Pulse     | I    | Incr. encoder1 A single-ended, or A+ diff. input, or Pulse, or analogue encoder Sin+ diff. input |
| 7    | GND                | -    | Return ground for sensors supply   |
| 8    | Temp Mot           | I    | NTC/PTC input. Used to read an analog temperature value  |
| 9    | GND                | -    | Return ground for sensors supply   |
| 10   | +5V <sub>OUT</sub> | O    | 5V output supply for I/O usage   |

| Pin  | Name                 | Type | Description  |
|------|----------------------|------|--|
| 1    | Z2-                  | I    | Incr. encoder2 Z- diff. input; has 120Ω resistor between pins 1 and 2  |
| 2    | Z2+                  | I    | Incr. encoder2 Z+ diff. input; has 120Ω resistor between pins 1 and 2  |
| 3    | B2-/Dir-/CLK-/MA-    | I/O  | Incr. encoder2 B- diff. input, or Dir-, or Clock- for SSI, or Master- for BiSS; has 120Ω resistor between pins 3 and 4   |
| 4    | B2+/Dir+/CLK+/MA+    | I/O  | Incr. encoder2 B+ diff. input, or Dir+, or Clock+ for SSI, or Master+ for BiSS; has 120Ω resistor between pins 3 and 4   |
| J4 5 | A2-/Pulse-/Data-/SL- | I    | Incr. encoder2 A- diff. input, or Pulse-, or Data- for SSI, or Slave- for BiSS; has 120Ω resistor between pins 5 and 6   |
| 6    | A2+/Pulse+/Data+/SL+ | I    | Incr. encoder2 A+ diff. input, or Pulse+, or Data+ for SSI, or Slave+ for BiSS; has 120Ω resistor between pins 5 and 6   |
| 7    | GND                  | -    | Return ground for sensors supply   |
| 8    | 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; Also connected to J7 pin12. |
| 9    | GND                  | -    | Return ground for sensors supply   |
| 10   | +5V <sub>OUT</sub>   | O    | 5V output supply for sensors usage   |

| Pin       | Name   | Type | Description                                      |
|-----------|--------|------|--|
| J5 & J6 1 | n.c.   | -    | J5 pin1 is internally connected only to J6 pin1. |
| 2         | GND    | -    | Return ground for RS-232 pins                    |
| 3         | CAN Hi | I/O  | CAN-Bus positive line(dominant high)             |
| 4         | CAN Lo | I/O  | CAN-Bus negative line (dominant low)             |

| Pin   | Name               | Type | Description  |
|-------|--------------------|------|--|
| 1     | IN5                | I    | 12-36V general-purpose digital PNP/NPN input   |
| 2     | +5V <sub>OUT</sub> | O    | 5V output supply for I/O usage   |
| 3     | 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                                  |
| 4     | IN0                | I    | 12-36V general-purpose digital PNP/NPN input   |
| 5     | n.c.               | -    | not connected  |
| 6     | IN3/LSN            | I    | 12-36V digital PNP/NPN input. Negative limit switch input  |
| 7     | OUT2/Error         | O    | 12-36V 0.5A, drive Error output, active low, NPN open-collector/TTL pull-up. Also drives the red Error LED.  |
| 8     | +V <sub>LOG</sub>  | I    | Positive terminal of the logic supply: 9 to 36V <sub>DC</sub> . Also internally connected to J1 pin 3.   |
| 9     | n.c.               | -    | not connected  |
| J7 10 | IN6                | I    | 12-36V general-purpose digital PNP/NPN input   |
| 11    | GND                | -    | Return ground for I/O pins   |
| 12    | 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; Connected also to J4 pin 8. |
| 13    | IN1                | I    | 12-36V general-purpose digital PNP/NPN input   |
| 14    | IN2/LSP            | I    | 12-36V digital PNP/NPN input. Positive limit switch input  |
| 15    | OUT0               | O    | 5-36V 0.5A, general-purpose digital output, NPN open-collector/TTL pull-up   |
| 16    | OUT3/Ready         | O    | 5-36V 0.5A, drive Ready output, active low, NPN open-collector/TTL pull-up. Also drives the green Ready LED.   |
| 17    | OUT1               | O    | 5-36V 0.5A, general-purpose digital output, NPN open-collector/TTL pull-up   |
| 18    | OUT4               | O    | 5-36V 0.5A, general-purpose digital output, NPN open-collector/TTL pull-up   |

|  |                                 |  |   |              |
|--|---------------------------------|--|---|--------------|
| Name<br>EP   | First edition<br>March 21, 2019 | Document template: P099.TQT.564.0001                                   | Last edition<br>March 21, 2019              | Visa :       |
|  <b>TECHNOSOFT</b> |                                 | Title of document<br><b>iPOS4808 BX-CAN-STO<br/>PRODUCT DATA SHEET</b> | N° document<br><b>P027.314.E201.DSH.10B</b> |              |
|  |                                 |  |   | Page: 2 of 5 |

# iPOS4808 BX-CAN-STO DATASHEET

P/N: P027.314.E201

| Pin | Name  | Type | Description                   |
|-----|-------|------|-------------------------------|
| 1   | 232TX | O    | RS-232 Data Transmission      |
| 2   | GND   | -    | Return ground for RS-232 pins |
| 3   | 232RX | I    | RS-232 Data Reception         |
| 4   | GND   | -    | Return ground for RS-232 pins |

| Pin | Name  | Type | Description   |
|-----|-------|------|---|
| 1   | STO2+ | I    | Safe Torque Off input 2, positive input (opto-isolated, 18÷40V) |
| 2   | STO1+ | I    | Safe Torque Off input 1, positive input (opto-isolated, 18÷40V) |
| 3   | STO2- | I    | Safe Torque Off input 2, negative return(opto-isolated, 18÷40V) |
| 4   | STO1- | I    | Safe Torque Off input 1, negative return(opto-isolated, 18÷40V) |

| SW1 Axis ID selection |          |  |
|-----------------------|----------|--|
| Switch                | Position | Description  |
| SW1                   | 0..F     | H/W Axis ID = 1 to 15 when switch is 1 to F<br>Exception: SW1 = 0 → Axis ID = 255. |

| SW2 HW Configuration selection DIP switch |          |  |
|---|----------|--|
| Pin                                       | Position | Description  |
| 1   | down(ON) | Disable STO1+ function. Connects internally +V <sub>LOG</sub> to STO1+ |
| 2   | down(ON) | Disable STO2+ function. Connects internally +V <sub>LOG</sub> to STO2+ |
| 3   | down(ON) | Connect an 120Ω resistor between Z1+ and Z1- feedback pins             |
| 4   | down(ON) | Connect an 120Ω resistor between B1+ and B1- feedback pins             |
| 5   | down(ON) | Connect an 120Ω resistor between A1+ and A1- feedback pins             |
| 6   | down(ON) | Select CANopen communication protocol                                  |
|   | up(OFF)  | Select TMLCAN communication protocol                                   |
| 7   | down(ON) | Disable STO1- function. Connects internally GND to STO1-               |
| 8   | down(ON) | Disable STO2- function. Connects internally GND to STO2-               |

## Electrical characteristics

- All parameters measured under the following conditions (unless otherwise specified):
- V<sub>LOG</sub> = 24 VDC; V<sub>MOT</sub> = 48VDC
  - Supplies start-up / shutdown sequence: -any-
  - Load current (sinusoidal amplitude / continuous BLDC, DC, stepper) = 8A

| Operating Conditions              |   | Min.   | Typ.     | Max.              | Units |
|-----------------------------------|---|--|----------|-------------------|-------|
| Ambient temperature               |   | 0  |          | 40 <sup>1,3</sup> | °C    |
| Ambient humidity                  | Non-condensing                              | 0  |          | 90                | %Rh   |
| Altitude / pressure <sup>2</sup>  | Altitude (vs. sea level)                    | -0.1   | 0 ÷ 2.5  | <sup>2</sup>      | Km    |
|                                   | Ambient Pressure                            | 0 <sup>2</sup>                               | 0.75 ± 1 | 10.0              | atm   |
| Storage Conditions                |   | Min.   | Typ.     | Max.              | Units |
| Ambient temperature               |   | -40  |          | 105               | °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 <sup>3</sup> , closed box |          |                   |       |
| Environmental Characteristics     |   | Min.   | Typ.     | Max.              | Units |
| Size ( Length x Width x Height )  | Without mating connectors                   | 88.5 x 77 x 16.4                             |          |                   | mm    |
|                                   | With recommended mating connectors.         | -3.48 x 3.03 x 0.65                          |          |                   | inch  |
| Weight                            | Without mating connectors                   | 98 x 85 x 19.5                               |          |                   | mm    |
|                                   | With recommended mating connectors.         | -3.86 x 3.35 x 0.77                          |          |                   | inch  |
| Weight                            | Without mating connectors                   | TBD  |          |                   | g     |
| Power dissipation                 | Idle (no load)                              | TBD  |          |                   | W     |
|                                   | Operating                                   | TBD  |          |                   |       |
| Efficiency                        |   | 98   |          |                   | %     |
| Cleaning agents                   | Dry cleaning is recommended                 | Only Water- or Alcohol- based                |          |                   |       |
| Protection degree                 | According to IEC60529, UL508                | IP20   |          |                   | -     |

| Logic Supply Input (+V <sub>LOG</sub> )         |  | Min.             | Typ. | Max. | Units           |
|---|--|------------------|------|------|-----------------|
| Supply voltage                                  | Nominal values   | 9                |      | 36   | V <sub>DC</sub> |
|   | Absolute maximum values, drive operating but outside guaranteed parameters             | 8                |      | 40   | V <sub>DC</sub> |
|   | Absolute maximum values, continuous  | -0.6             |      | 42   | V <sub>DC</sub> |
|   | Absolute maximum values, surge (duration ≤ 10ms) <sup>†</sup>                          | -1               |      | +45  | V               |
| Supply current                                  | +V <sub>LOG</sub> = 12V  |                  | 130  |      | mA              |
|   | +V <sub>LOG</sub> = 24V  |                  | 90   | 280  |                 |
|   | +V <sub>LOG</sub> = 40V  |                  | 85   |      |                 |
| Motor Supply Input (+V <sub>MOT</sub> )         |  | Min.             | Typ. | Max. | Units           |
| Supply voltage                                  | Nominal values   | 11               |      | 50   | V <sub>DC</sub> |
|   | Absolute maximum values, drive operating but outside guaranteed parameters             | 9                |      | 52   | V <sub>DC</sub> |
|   | Absolute maximum values, continuous  | -0.6             |      | 54   | V <sub>DC</sub> |
|   | Absolute maximum values, surge (duration ≤ 10ms) <sup>†</sup>                          | -1               |      | 57   | V               |
| Supply current                                  | Idle   |                  | 1    | 5    | mA              |
|   | Operating  | -20              | ±8   | +20  |                 |
|   | Absolute maximum value, short-circuit condition (duration ≤ 10ms) <sup>†</sup>         |                  |      | 26   |                 |
| Motor Outputs (A/A+, B/A-, C/B+, BR/B-)         |  | Min.             | Typ. | Max. | Units           |
| Nominal output current, continuous <sup>4</sup> | for DC brushed, steppers and BLDC motors with Hall-based trapezoidal control           |                  |      | 8    | A               |
|   | for PMSM motors with FOC sinusoidal control (sinusoidal amplitude value)               |                  |      | 8    |                 |
|   | for PMSM motors with FOC sinusoidal control (sinusoidal effective value)               |                  |      | 5.66 |                 |
| Motor output current, peak                      | maximum 2.5s   | -20              |      | +20  | A               |
| Short-circuit protection threshold              |  | ±22              | ±26  | ±30  | A               |
| Short-circuit protection delay                  |  | 5                | 10   |      | µs              |
| On-state voltage drop                           | Nominal output current; including typical mating connector contact resistance          |                  | ±0.3 | ±0.5 | V               |
| Off-state leakage current                       |  |                  | ±0.5 | ±1   | mA              |
| Motor inductance (phase-to-phase)               | Recommended value, for current ripple max. ±5% of full range; +V <sub>MOT</sub> = 36 V | F <sub>PWM</sub> |      |      | µH              |
|   |  | 20 kHz           | 330  |      |                 |
|   |  | 40 kHz           | 150  |      |                 |
|   |  | 60 kHz           | 120  |      |                 |
|   |  | 80 kHz           | 80   |      |                 |
|   |  | 100 kHz          | 60   |      |                 |
| Motor inductance (phase-to-phase)               | Minimum value, limited by short-circuit protection; +V <sub>MOT</sub> = 36 V           | 20 kHz           | 120  |      | µH              |
|   |  | 60 kHz           | 40   |      |                 |
|   |  | 40 kHz           | 30   |      |                 |
|   |  | 80 kHz           | 15   |      |                 |
|   |  | 100 kHz          | 8    |      |                 |
|   |  | 100 kHz          | 8    |      |                 |
| Motor electrical time-constant (L/R)            | Recommended value for ±5% current measurement error                                    | 20 kHz           | 250  |      | µs              |
|   |  | 40 kHz           | 125  |      |                 |
|   |  | 60 kHz           | 100  |      |                 |
|   |  | 80 kHz           | 63   |      |                 |
|   |  | 100 kHz          | 50   |      |                 |
| Current measurement                             | FS = Full Scale accuracy   |                  | ±4   | ±8   | %FS             |

<sup>1</sup> Operating temperature at higher temperatures is possible with reduced current and power ratings  
<sup>2</sup> iPOS4808 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.

<sup>3</sup> In case of forced cooling (conduction or ventilation) the maximum ambient temperature can be increased substantially.

<sup>4</sup> @20KHz F<sub>PWM</sub>

|  |                                 |  |   |        |
|--|---------------------------------|--|---|--------|
| Name<br>EP   | First edition<br>March 21, 2019 | Document template: P099.TQT.564.0001                                   | Last edition<br>March 21, 2019              | Visa : |
|  <b>TECHNOSOFT</b> |                                 | Title of document<br><b>iPOS4808 BX-CAN-STO<br/>PRODUCT DATA SHEET</b> | N° document<br><b>P027.314.E201.DSH.10B</b> |        |
|  |                                 |  | Page: 3 of 5                                |        |

# iPOS4808 BX-CAN-STO DATASHEET

## P/N: P027.314.E201

| Digital Inputs (IN0, IN1, IN2/LSP, IN3/LSN, IN5, IN6) <sup>1</sup> |  | Min.      | Typ. | Max. | Units |
|--|--|-----------|------|------|-------|
| Mode compliance  |  | PNP       |      |      |       |
| Default state  | Input floating (wiring disconnected)                 | Logic LOW |      |      |       |
| Input voltage  | Logic "LOW"  | -36       | 0    | 2.4  | V     |
|  | Logic "HIGH"   | 7.5       | 24   | 36   |       |
|  | Hysteresis   | 1.2       | 2.4  | 2.8  |       |
|  | Floating voltage (not connected)                     |           | 0    |      |       |
|  | Absolute maximum, continuous                         | -36       |      | +39  |       |
| Input current  | Absolute maximum, surge (duration ≤ 1S) <sup>†</sup> | -50       |      | +50  | mA    |
|  | Logic "LOW"; pulled to GND                           |           | 0    |      |       |
|  | Logic "HIGH"; pulled to +24V                         |           | 9    | 10   |       |

| Digital Inputs (IN0, IN1, IN2/LSP, IN3/LSN, IN5, IN6) <sup>1</sup> |  | Min.       | Typ. | Max. | Units |
|--|--|------------|------|------|-------|
| Mode compliance  |  | NPN        |      |      |       |
| Default state  | Input floating (wiring disconnected)                 | Logic HIGH |      |      |       |
| Input voltage  | Logic "LOW"  | -36        | 0    | 2.2  | V     |
|  | Logic "HIGH"   | 7.5        |      | 36   |       |
|  | Hysteresis   | 1.2        | 2.4  | 2.8  |       |
|  | Floating voltage (not connected)                     |            | 23   |      |       |
|  | Absolute maximum, continuous                         | -36        |      | +39  |       |
| Input current  | Absolute maximum, surge (duration ≤ 1S) <sup>†</sup> | -50        |      | +50  | mA    |
|  | Logic "LOW"; Pulled to GND                           |            | 9    | 10   |       |
|  | Logic "HIGH"; Pulled to +24V                         |            |      | 0.4  |       |

|                 |                  |     |  |     |     |
|-----------------|------------------|-----|--|-----|-----|
| Input frequency |                  | 0   |  | 150 | kHz |
| Minimum pulse   |                  | 3.3 |  |     | µs  |
| ESD protection  | Human body model | ±2  |  |     | kV  |

| Digital Outputs (OUT0, OUT1, OUT2/Error, OUT3/ Ready, OUT4) |   | Min.                           | Typ.             | Max.                  | Units |     |
|---|---|--------------------------------|------------------|-----------------------|-------|-----|
| Mode compliance   | All outputs (OUT0, OUT1, OUT2/Error, OUT3/Ready)                            | TTL / open-collector / NPN 24V |                  |                       |       |     |
| Default state   | Not supplied (+V <sub>Log</sub> floating or to GND)                         | High-Z (floating)              |                  |                       |       |     |
|   | Immediately after power-up  | OUT0, OUT1, OUT4               | Logic "HIGH"     |                       |       |     |
|   |   | OUT2/Error, OUT3/ Ready        | Logic "LOW"      |                       |       |     |
| Normal operation  | OUT0, OUT1, OUT2/Error  | Logic "HIGH"                   |                  |                       |       |     |
|   | OUT3/Ready  | Logic "LOW"                    |                  |                       |       |     |
| Output voltage  | Logic "LOW"; output current = 0.5A  |                                |                  | 0.8                   | V     |     |
|   | Logic "HIGH"; output current = 0, no load                                   | OUT2/Error, OUT3/ Ready        | 2.9              | 3                     |       | 3.3 |
|   |   | OUT0, OUT1, OUT4               | 4                | 4.5                   |       | 5   |
|   | Logic "HIGH", external load to +V <sub>Log</sub>                            |                                | V <sub>Log</sub> |                       |       |     |
|   | Absolute maximum, continuous  | -0.5                           |                  | V <sub>Log</sub> +0.5 |       |     |
| Output current  | Absolute maximum, surge (duration ≤ 1S) <sup>†</sup>                        | -1                             |                  | V <sub>Log</sub> +1   | mA    |     |
|   | Logic "LOW", sink current   |                                |                  | 0.5                   |       |     |
|   | Logic "LOW", sink current, pulse ≤ 5 sec.                                   |                                |                  | 1                     |       |     |
|   | Logic "HIGH", source current; external load to GND; V <sub>OUT</sub> ≥ 2.0V | OUT2/Error, OUT3/ Ready        |                  |                       |       | 2   |
|   |   | OUT0, OUT1, OUT4               |                  |                       |       | 4   |

|   | Logic "HIGH", leakage current; external load to +V <sub>Log</sub> ; V <sub>OUT</sub> = V <sub>Log</sub> max = 40V |                             | 0.1  | 0.2  | mA    |
|---|---|-----------------------------|------|------|-------|
| Minimum pulse width   |   | 2                           |      |      | µs    |
| ESD protection  | Human body model  | ±15                         |      |      | kV    |
| Digital Hall Inputs (Hall1, Hall2, Hall3)   |   | 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) <sup>†</sup>  | -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    |
| Encoder1 Inputs (A1/A1+, A1-, B1/B1+, B1-, Z1/Z1+, Z1-)                           |   | 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                         |      |      |       |
| 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"; Internal 2.2KΩ pull-up to +5  | 0                           | 0    | 0    | mA    |
|   | Logic "LOW"; Pull to GND  |                             | 5.5  | 6    |       |
| Differential mode compliance  | For full RS422 compliance, see <sup>2</sup>   | 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   |       |
| Minimum pulse width   | Single-ended mode, Open-collector / NPN   | 1                           |      |      | µs    |
|   | Differential mode, or Single-ended driven by push-pull (TTL / CMOS)   | 50                          |      |      |       |
| Input voltage, any pin to GND   | Absolute maximum values, continuous   | -7                          |      | +7   | V     |
|   | Absolute maximum, surge (duration ≤ 1S) <sup>†</sup>  | -11                         |      | +14  |       |
| ESD protection  | Human body model  | ±1                          |      |      | kV    |
| Encoder2 Inputs (A2+/Data+, A2-/Data-, B2+/Clk+, B2-/Clk-, Z2+, Z2-) <sup>3</sup> |   | 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  |       |
| Input impedance, differential   | Common-mode range (A+ to GND, etc.)   | -11                         |      | +14  | Ω     |
|   | A2+, B2+, Z2+ A2-, B2-, Z2-   |                             | 150  |      |       |
| Input frequency   | Differential mode   | 0                           |      | 10   | MHz   |
| Minimum pulse width   | Differential mode   | 50                          |      |      | ns    |

<sup>1</sup> The digital inputs are software selectable as PNP or NPN

<sup>2</sup> For full RS-422 compliance, 150Ω termination resistors must be connected across the differential pairs, set SW2 pins 3, 4 and 5 to ON.

<sup>3</sup> Encoder2 differential input pins have internal 150Ω termination resistors connected across

|  |                |   |                |                              |
|--|----------------|---|----------------|------------------------------|
| Name   | First edition  | Document template: P099.TQT.564.0001                    | Last edition   | Visa :                       |
| EP   | March 21, 2019 |   | March 21, 2019 |                              |
|  |                | Title of document                                       | N° document    |                              |
|  |                | <b>iPOS4808 BX-CAN-STO</b><br><b>PRODUCT DATA SHEET</b> |                | <b>P027.314.E201.DSH.10B</b> |
|  |                |   |                | Page: 4 of 5                 |

# iPOS4808 BX-CAN-STO DATASHEET

## P/N: P027.314.E201

| 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 <sub>PP</sub>                 |
| Input voltage, any pin to GND                        | Operational range   | -1                  | 2.5  | 4      | V                               |
|  | Absolute maximum values, continuous                       | -7                  |      | +7     |                                 |
|  | Absolute maximum, surge (duration ≤ 1s) <sup>†</sup>      | -11                 |      | +14    |                                 |
| Input impedance                                      | Differential, Sin+ to Sin-, Cos+ to Cos- <sup>1</sup>     | 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) <sup>†</sup>      |                     |      | ±36    |                                 |
| Input impedance                                      | To GND  |                     | 28   |        | kΩ                              |
| Resolution   |   |                     | 12   |        | bits                            |
| Integral linearity                                   |   |                     |      | ±2     | bits                            |
| Offset error   |   |                     | ±2   | ±10    | bits                            |
| Gain error   |   |                     | ±1%  | ±3%    | % FS <sup>2</sup>               |
| Bandwidth (-3Db)                                     | Software selectable                                       | 0                   |      | 1      | kHz                             |
| ESD protection                                       | Human body model  | ±5                  |      |        | 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                              |
| 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 Failures per Hour - dangerous)       | 8*10 <sup>-10</sup> |      |        | hour <sup>-1</sup> (0.8 FIT)    |
| EN13849-1 Classification                             | Performance Level   |                     |      |        | Cat3/PLe                        |
|  | MTTFd (meantime to dangerous failure)                     | 377                 |      |        | years                           |
| Mode compliance                                      |   |                     |      |        | PNP                             |
| Default state  | Input floating (wiring disconnected)                      |                     |      |        | Logic LOW                       |
| Input voltage  | Logic "LOW" (PWM operation disabled)                      | -20                 |      | 5.6    | V                               |
|  | Logic "HIGH" (PWM operation enabled)                      | 18                  |      | 36     |                                 |
|  | Absolute maximum, continuous                              | -20                 |      | +40    |                                 |
| Input current  | Logic "LOW"; pulled to GND                                |                     | 0    |        | mA                              |
|  | Logic "HIGH", pulled to +Vlog                             |                     | 5    | 13     |                                 |
| Pulse duration                                       | Ignored high-low-high                                     |                     |      | 5      | ms                              |
|  | Accepted pulse  |                     |      | 20     | Hz                              |
| PWM operation delay                                  | From Enabled low-high transition to PWM operation enabled |                     |      | 30     | ms                              |
| 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 ÷ 15 ; 255 (all bits 0)   |      |      | -     |
|                     | by software using EasySetup | 1-255   |      |      |       |
| ESD protection      | Human body model            | ±15   |      |      | kV    |
| Supply Output (+5V) |                             | Min.  | Typ. | Max. | Units |
| Output voltage      | Current sourced = 250mA     | 4.8   | 5    | 5.2  | V     |
| Output current      |                             | 600   | 650  |      | mA    |
| Short-circuit       |                             | NOT protected   |      |      |       |
| Over-voltage        |                             | NOT protected   |      |      |       |
| ESD protection      | Human body model            | ±1  |      |      | 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) |      |      |       |

<sup>†</sup> 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.

<sup>1</sup> For many applications, a 120Ω termination resistor should be connected across SIN+ to SIN-, and across COS+ to COS- (set SW2 switches 3 and 4 to ON). Please consult the feedback device datasheet for confirmation.

<sup>2</sup> "FS" stands for "Full Scale"

|  |                                 |  |   |              |
|--|---------------------------------|--|---|--------------|
| Name<br>EP   | First edition<br>March 21, 2019 | Document template: P099.TQT.564.0001                                       | Last edition<br>March 21, 2019                  | Visa :       |
|  <b>TECHNOSOFT</b> |                                 | Title of document<br><br><b>iPOS4808 BX-CAN-STO<br/>PRODUCT DATA SHEET</b> | N° document<br><br><b>P027.314.E201.DSH.10B</b> | Page: 5 of 5 |