Micro 4803 MZ / PZ / CZ / HZ



Intelligent Servo Drive for DC, Brushless DC and AC Motors

Intelligent Servo Drives



Technical Reference

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Read This First

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About This Manual

This book is a technical reference manual for:

Product Name	Part Number	Description	Nominal current	Peak Current	Communication	
Micro 4803 MZ-CAT	P020.001.E122	Dina Varaian	24/424	10.60/150	RS232, USB, EtherCAT®	
Micro 4803 MZ-CAN	P020.001.E102	Pins Version	3A _{RMS} / 4.2A	10.6A _{RMS} / 15A	RS232; USB; CAN	
Micro 4803 PZ-CAT	P020.001.E322	Enhanced Pins Version	Enhanced	44/ 5 641	10.64/154	RS232, USB, EtherCAT®
Micro 4803 PZ-CAN	P020.001.E302		4A _{RMS} / 5.6A ¹	10.6A _{RMS} / 15A	RS232; USB; CAN	
Micro 4803 CZ-CAT	P020.801.E222	Standalone Version	ΔΔρμς / 5 6Δ	10.6A _{RMS} / 15A	RS232, USB, EtherCAT®	
Micro 4803 CZ-CAN	P020.801.E202				RS232; USB; CAN	
Micro 4803 HZ-CAN	P020.001.E202	Connectors Version	3A _{RMS} / 4.2A	10.6A _{RMS} / 15A	RS232; CAN	

In order to operate the Micro 4803 drives, you need to pass through 3 steps:

- ☐ Step 1 Hardware installation
- Step 2 Drive setup using Technosoft EasySetUp software for drive commissioning
- Step 3 Motion programming using one of the options:
 - ☐ CANopen master² or an EtherCAT® master³
 - ☐ The drives **built-in motion controller** executing a Technosoft Motion Language (**TML**) program developed using Technosoft **EasyMotion Studio** software
 - ☐ A TML LIB motion library for PCs (Windows or Linux)⁴
 - ☐ A TML LIB motion library for PLCs¹
 - ☐ A **distributed control** approach which combines the above options, like for example a host calling motion functions programmed on the drives in TML

This manual covers **Step 1** in detail. It describes the **Micro 4803** hardware including the technical data, the connectors and the wiring diagrams needed for installation.

For **Step 2 and 3**, please consult the document **EasyMotion Studio – Quick Setup and Programming Guide.** For detailed information regarding the next steps, refer to the related documentation.

Notational Conventions

This document uses the following conventions:

- Micro 4803- all products described in this manual
- IU units Internal units of the drive
- SI units International standard units (meter for length, seconds for time, etc.)
- STO Safe Torque Off
- TML Technosoft Motion Language
- CANopen Standard communication protocol that uses 11-bit message identifiers over CAN-bus
- TMLCAN Technosoft communication protocol for exchanging TML commands via CAN-bus, using 29bit message identifiers
- CoE CAN application protocol over EtherCAT

¹ Limited to 3A_{RMS} / 4.2A amplitude nominal using the recommended mating connectors. For current values >3A_{RMS} pins needs to be soldered.

² When Micro 4803x CAN drive is set in CANOpen mode

³ When Micro 4803x CAT drive is used

⁴ Available for Micro 4803x CAN

EtherCAT® is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.

Related Documentation

Micro 4803 MZ-CAT Datasheet (P020.001.E122.DSH)

Micro 4803 MZ-CAN Datasheet (P020.001.E102.DSH)

Micro 4803 PZ-CAT Datasheet (P020.001.E322.DSH)

Micro 4803 PZ-CAN Datasheet (P020.001.E302.DSH)

Micro 4803 HZ-CAN Datasheet (P020.001.E202.DSH)

Micro 4803 CZ-CAT Datasheet (P020.801.E222.DSH)

Micro 4803 CZ-CAN Datasheet (P020.801.E202.DSH)

 describes the hardware connections of the Micro 4803 family of intelligent servo drives including the technical data and connectors.

Micro 4803 Hardware revisions and pinout changes (part no P020.001.0101.DOC.01.x0) – describes the hardware revisions and pinout changes of Micro 4803, the recommended applications and compatible firmware for each revision.

EasyMotion Studio – Quick Setup and Programming Guide (P091.034.ESM-Quick.Setup.and.Programming.Guide.UM.xxxx) – describes the compatible software installation, drive software setup commissioning, introduction to TML motion programming and motion evaluation tools.

- Help of the EasySetUp software describes how to use EasySetUp to quickly setup any Technosoft drive for your application using only 2 dialogues. The output of EasySetUp is a set of setup data that can be downloaded into the drive EEPROM or saved on a PC file. At power-on, the drive is initialized with the setup data read from its EEPROM. With EasySetUp it is also possible to retrieve the complete setup information from a drive previously programmed. EasySetUp can be downloaded free of charge from Technosoft web page
- Motion Programming using EasyMotion Studio (part no. P091.034.ESM.UM.xxxx) describes how to use the EasyMotion Studio to create motion programs using in Technosoft Motion Language (TML). EasyMotion Studio platform includes EasySetUp for the drive/motor setup, and a Motion Wizard for the motion programming. The Motion Wizard provides a simple, graphical way of creating motion programs and automatically generates all the TML instructions. With EasyMotion Studio you can fully benefit from a key advantage of Technosoft drives their capability to execute complex motions without requiring an external motion controller, thanks to their built-in motion controller. A demo version of EasyMotion Studio (with EasySetUp part fully functional) can be downloaded free of charge from the Technosoft web page
- **iPOS CoE Programming (part no. P091.064.UM.0919)** describes how to program the Technosoft intelligent drives equipped with EtherCAT® communication interface. These drives support CAN application protocol over EtherCAT® (CoE) in conformance with CiA 402 device profile. The manual presents the object dictionary associated with this profile. The manual also explains how to combine the Technosoft Motion Language and the CoE commands in order to distribute the application between the EtherCAT® master and the Technosoft drives.
- TML_LIB v2.0 (part no. P091.040.v20.UM.xxxx) explains how to program in C, C++,C#, Visual Basic or Delphi Pascal a motion application for the Technosoft intelligent drives using TML_LIB v2.0 motion control library for PCs. The TML_lib includes ready-to-run examples that can be executed on Windows or Linux (x86 and x64).
- **TML_LIB_LabVIEW v2.0** (part no. P091.040.LABVIEW.v20.UM.xxxx) explains how to program in LabVIEW a motion application for the Technosoft intelligent drives using TML_LIB_LabVIEW v2.0 motion control library for PCs. The TML_Lib_LabVIEW includes over 40 ready-to-run examples.
- TML_LIB_S7 (part no. P091.040.S7.UM.xxxx) explains how to program in a PLC Siemens series S7-300 or S7-400 a motion application for the Technosoft intelligent drives using TML_LIB_S7 motion control library. The TML_LIB_S7 library is IEC61131-3 compatible.
- TML_LIB_CJ1 (part no. P091.040.CJ1.UM.xxxx) explains how to program in a PLC Omron series CJ1 a motion application for the Technosoft intelligent drives using TML_LIB_CJ1 motion control library for PLCs. The TML LIB CJ1 library is IEC61131-3 compatible.
- **TML_LIB_X20** (part no. P091.040.X20.UM.xxxx) explains how to program in a PLC B&R series X20 a motion application for the Technosoft intelligent drives using TML_LIB_X20 motion control library for PLCs. The TML_LIB_X20 library is IEC61131-3 compatible.

If you want to	Contact Technosoft at
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Make suggestions about, or report errors in documentation.	Mail: Technosoft SA Avenue des Alpes 20 CH-2000 Neuchatel, NE Switzerland

1 Safety information

Read carefully the information presented in this chapter before carrying out the drive installation and setup! It is imperative to implement the safety instructions listed hereunder.

This information is intended to protect you, the drive and the accompanying equipment during the product operation. Incorrect handling of the drive can lead to personal injury or material damage.

The following safety symbols are used in this manual:



WARNING! SIGNALS A DANGER TO THE OPERATOR WHICH MIGHT CAUSE BODILY INJURY. MAY INCLUDE INSTRUCTIONS TO PREVENT THIS SITUATION



CAUTION! SIGNALS A DANGER FOR THE DRIVE WHICH MIGHT DAMAGE THE PRODUCT OR OTHER EQUIPMENT. MAY INCLUDE INSTRUCTIONS TO AVOID THIS SITUATION



CAUTION! Indicates areas SENSITIVE TO electrostatic discharges (ESD) WHICH REQUIRE HANDLING IN AN ESD PROTECTED ENVIRONMENT

1.1 Warnings



WARNING! THE VOLTAGE USED IN THE DRIVE MIGHT CAUSE ELECTRICAL SHOCKS. DO NOT TOUCH LIVE PARTS WHILE THE POWER SUPPLIES ARE ON



WARNING! TO AVOID ELECTRIC ARCING AND HAZARDS, NEVER CONNECT / DISCONNECT WIRES FROM THE DRIVE WHILE THE POWER SUPPLIES ARE ON



WARNING! THE DRIVE MAY HAVE HOT SURFACES DURING OPERATION.



WARNING! DURING DRIVE OPERATION, THE CONTROLLED MOTOR WILL MOVE. KEEP AWAY FROM ALL MOVING PARTS TO AVOID INJURY



CAUTION! THE POWER SUPPLIES CONNECTED TO THE DRIVE MUST COMPLY WITH THE PARAMETERS SPECIFIED IN THIS DOCUMENT



CAUTION! TROUBLESHOOTING AND SERVICING ARE PERMITTED ONLY FOR PERSONNEL AUTHORISED BY TECHNOSOFT



CAUTION! THE DRIVE CONTAINS ELECTROSTATICALLY SENSITIVE COMPONENTS WHICH MAY BE DAMAGED BY INCORRECT HANDLING. THEREFORE THE DRIVE SHALL BE REMOVED FROM ITS ORIGINAL PACKAGE ONLY IN AN ESD PROTECTED ENVIRONMENT

To prevent electrostatic damage, avoid contact with insulating materials, such as synthetic fabrics or plastic surfaces. In order to discharge static electricity build-up, place the drive on a grounded conductive surface and also ground yourself.

1.3 Quality system, conformance and certifications

qualityaustria Succeed with Quality	IQNet and Quality Austria certification about the implementation and maintenance of the Quality Management System which fulfills the requirements of Standard ISO 9001:2015 .			
- Net	Quality Austria Certificate about the application and further development of an effective Quality Management System complying with the requirements of Standard ISO 9001:2015			
REACH	REACH Compliance - TECHNOSOFT hereby confirms that this product comply with the legal obligations regarding Article 33 of the European REACH Regulation 1907/2006 (Registration, Evaluation, Authorization and Restriction of Chemicals), which came into force on 01.06.2007.			
ROHS	RoHS Compliance - Technosoft SA here with declares that this product is manufactured in compliance with the RoHS directive 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)			
CE	Technosoft SA hereby declares that this product conforms to the following European applicable directives: 2014/30/EU Electromagnetic Compatibility (EMC) Directive 2014/35/EU Low Voltage Directive (LVD) 93/68/EEC CE Marking Directive			
Towns to the state of the state	Conflict minerals statement - Technosoft declares that the company does not purchase 3T&G (tin, tantalum, tungsten & gold) directly from mines or smelters We have no indication that Technosoft products contain minerals from conflict mines or smelters in and around the DRC.			

For other certifications visit: https://technosoftmotion.com/en/quality/

2 Product Overview

2.1 Introduction

The **Micro 4803** is a family of fully digital intelligent servo drives, based on the latest DSP technology and they offer unprecedented drive performance combined with an embedded motion controller.

Suitable for control of brushless DC, brushless AC (vector control) and DC brushed motors the Micro 4803 drives accept as position feedback incremental encoders, absolute encoders (SSI, BiSS-C, EnDAT, TAMAGAWA, Panasonic, Nikon, Sanyo Denki) and linear Hall signals.

All drives perform position, speed or torque control and work in single, multi-axis or stand-alone configurations. Thanks to the embedded motion controller, the Micro 4803 drives combine controller, drive and PLC functionality in a single compact unit and are capable to execute complex motions without requiring intervention of an external motion controller. Using the high-level Technosoft Motion Language (TML) the following operations can be executed directly at drive level:

Ш	Setting various motion modes (profiles, PVT, PT, electronic gearing or camming, etc.)
	Changing the motion modes and/or the motion parameters
	Executing homing sequences
	Controlling the program flow through:
•	Conditional jumps and calls of TML functions
•	TML interrupts generated on pre-defined or programmable conditions (protections triggered, transitions on
	limit switch or capture inputs, etc.)
•	Waits for programmed events to occur
	Handling of digital I/O and analogue input signals
	Executing arithmetic and logic operations
	Performing data transfers between axes
	Controlling motion of an axis from another one via motion commands sent between axes
	Sending commands to a group of axes (multicast). This includes the possibility to start simultaneously motion
	sequences on all the axes from the group
	Synchronizing all the axes from a network

By implementing motion sequences directly at drive level you can really distribute the intelligence between the master and the drives in complex multi-axis applications, reducing both the development time and the overall communication requirements. For example, instead of trying to command each movement of an axis, you can program the drives using TML to execute complex motion tasks and inform the master when these tasks are done. Thus, for each axis control the master job may be reduced at: calling TML functions stored in the drive EEPROM and waiting for a message, which confirms the TML functions execution completion.

All Micro 4803 CAN drives are equipped with a serial RS232 and a CAN 2.0B interface that can be set by hardware pins to operate in 2 communication protocol modes:

CANopen
TMLCAN

When **CANopen** mode is selected, the drive conforms to **CiA 301 v4.2** application layer communication profile, the **CiA WD 305 v2.2.13** and **CiA DSP 402 v4.1.1** device profile for drives and motion control, now included in IEC 61800-7-1 Annex A, IEC 61800-7-201 and IEC 61800-7-301 standards. In this mode, the drive may be controlled via a CANopen master. The drive offers the possibility for a CANopen master to call motion sequences/ functions, written in TML and stored in the drive EEPROM, using manufacturer specific objects. Also, the drives can communicate separately between each other by using non reserved 11 bit identifiers.

When **TMLCAN** mode is selected, the unit behaves as standard Technosoft intelligent drive and conforms to Technosoft protocol for exchanging **TML commands via CAN-bus**. When TMLCAN protocol is used, it is not mandatory to have a master. Any drive can be set to operate standalone, and may play the role of a master to coordinate both the network communication/synchronization and the motion application via **TML commands** sent directly to the other drives.

For Micro 4803 commissioning EasySetUp or EasyMotion Studio PC applications may be used.

EasySetUp is a subset of EasyMotion Studio, including only the drive setup part. The output of EasySetUp is a set of setup data that can be downloaded into the drive EEPROM or saved on a PC file. At power-on, the drive is initialized with the setup data read from its EEPROM. With EasySetUp it is also possible to retrieve the complete setup

-

¹ Available if the master axis sends its position via a communication channel, or by using the secondary encoder input

information from a drive previously programmed. EasySetUp shall be used for drive setup in all cases where the motion commands are sent exclusively from a master. Hence neither the Micro 4803 TML programming capability nor the drive camming mode are used. **EasySetUp can be downloaded free of charge from Technosoft web page.**

EasyMotion Studio platform includes EasySetUp for the drive setup, and a **Motion Wizard** for the motion programming. The Motion Wizard provides a simple, graphical way of creating motion programs and automatically generates all the TML instructions. *With EasyMotion Studio you can execute complex motions, thanks to their built-in motion controllers*. EasyMotion Studio, may be used to program motion sequences in TML.

A demo version of EasyMotion Studio (with EasySetUp part fully functional) can be downloaded free of charge from Technosoft web page.

2.2 Product Features

- Fully digital servo drive suitable for the control of rotary or linear brushless and DC brush
- · Very compact design
- Sinusoidal (FOC) or trapezoidal (Hall-based) control of brushless motors
- Technosoft Motion Language (TML) instruction set for the definition and execution of motion sequences
- Standalone operation with stored motion sequences
- Motor supply: 7-48V; Logic supply: 6-48V; PWM switching frequency: up to 100kHz
- Output current:
 - Nominal:
 - Micro 4803 MZ: 3A_{RMS} / 4.2A amplitude;
 - Micro 4803 HZ: 3A_{RMS} / 4.2A amplitude;
 - Micro 4803 PZ: 4A_{RMS} / 5.6A¹ amplitude;
 - Micro 4803 CZ: 4A_{RMS} / 5.6A amplitude.
 - Peak: 10A_{RMS} / 14A amplitude.
- Thermal Protection: The internal temperature sensor disables the PWM outputs if the measured temperature exceeds 105°C
- Various modes of operation, including:
 - Position profiles with trapezoidal or S-curve speed shape
 - Position, Velocity, Time (PVT) 3rd order interpolation
 - Position, Time (PT) 1st order interpolation
 - · Electronic gearing and camming
 - 40 Homing modes
 - CAN version: including: torque, speed or position control; position or speed profiles, Cyclic Synchronous Position (CSP), Cyclic Synchronous Velocity (CSV) and Cyclic Synchronous Torque (CST) for CANopen mode; external reference mode (analogue or encoder feedback) or sent via a communication bus
 - EtherCAT version: position or speed profiles, Cyclic Synchronous Position (CSP), Cyclic Synchronous Velocity (CSV) and Cyclic Synchronous Torque (CST)
- · Digital and analog I/Os:
 - 1 x analogue input software selectable: 12-bit 0-5V or ±10V: Reference, Feedback or general purpose
 - 3 x digital inputs: 2 for limit switches + one Enable, NPN, pull-to-GND to activate, pull-up on-board to +5V. Pull to GND to activate
 - 3 x configurabile I/Os, each software selectable as:
 - Digital input, NPN, with pull-up on-board to +5V. Pull to GND to activate;
 - Digital output, NPN (open-collector), with pull-up on-board to +5V. Sink current: 1 x 1.5A to drive inductive loads (such as mechanical brake), 2 x 0.1A.
- Feedback devices (dual-loop support)
 - 1 x Hall sensor interface (digital or linear)

1st feedback devices supported:

- Incremental A / B (index Z available only for 1 encoder): differential or single-ended
- Pulse & direction interface (single-ended or differential) for external (master) digital reference
- Absolute: differential or single-ended encoder. Supported protocols: SSI, BiSS, EnDAT, TAMAGAWA, Panasonic, Nikon, Sanyo Denki

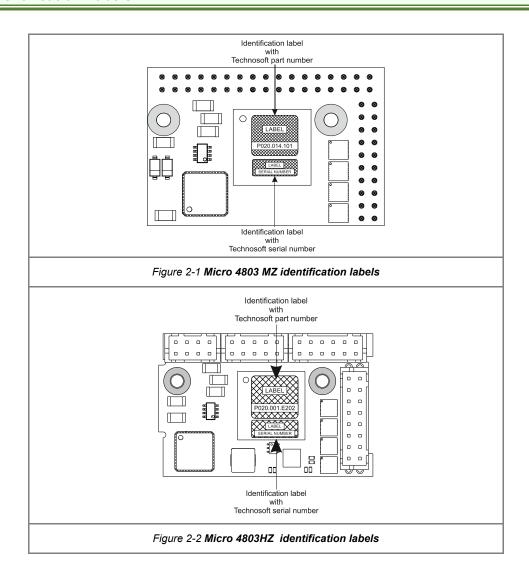
¹ Limited to 3A_{RMS} / 4.2A amplitude nominal using the recommended mating connectors. For current values >3A_{RMS} pins needs to be soldered.

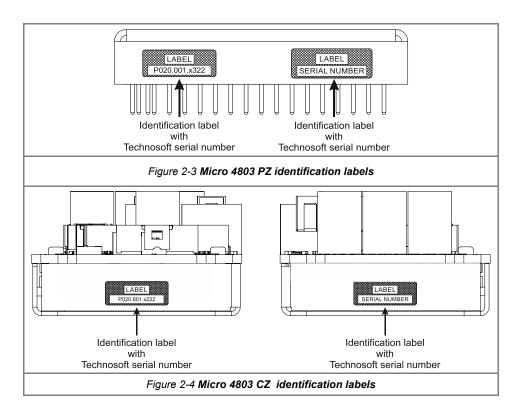
2nd feedback devices supported:

- Incremental encoder interface:
 - Micro 4803 MZ/PZ/HZ: Incremental A / B: differential or single-ended
 - Micro 4803 CZ: Incremental A / B: differential
- Pulse & direction interface for external (master) digital reference
- **Absolute:** differential or single-ended encoder. Supported protocols: SSI, BiSS, EnDAT, TAMAGAWA, Panasonic, Nikon, Sanyo Denki
- EtherCAT® supported protocols for CAT drives:
 - **FoE** File over EtherCAT for setup/TML functions and firmware update
 - EoE Ethernet over EtherCAT for Easy Motion studio communication over EtherCAT
- 16K × 16 SRAM memory for data acquisition
- 24K x 16 E2ROM to store TML motion programs, cam tables and other user data
- Operating ambient temperature: 0-40°C (over 40°C with derating)
- Voltage efficiency: >99%
- · Feature that detects breakage of Hall wires and/or of incremental/absolute encoder wires
- · Protections:
 - Short-circuit between motor phases
 - Short-circuit from motor phases to ground
 - Over-voltage
 - Under-voltage

- Over-current
- Over-temperature
- Communication error
- Control error

2.3 Identification Labels





The Micro 4803 can have the following part numbers and names on the identification label:

Product Name	Part Number
Micro 4803 MZ-CAT	P020.001.E122
Micro 4803 MZ-CAN	P020.001.E102
Micro 4803 PZ-CAT	P020.001.E322
Micro 4803 PZ-CAN	P020.001.E302
Micro 4803 CZ-CAT	P020.801.E222
Micro 4803 CZ-CAN	P020.801.E202
Micro 4803 HZ-CAN	P020.001.E202

2.4 **Supported Motor-Sensor Configurations**

2.4.1 Single loop configurations

The position and/or speed are controlled using one feedback sensor. The other available feedback sensor input can be used for External reference Position or Velocity, Pulse and Direction, Electronic Gearing or Camming.

Motor sensors					Motor types			
Encoder ¹	Digital Halls	Linear Halls	Tacho	Brushless PMSM ²	Brushless BLDC ³	Brushed DC Voice coils		
Incremental encoder ⁴ / SSI / EnDAT2.2 / BiSS-C / Tamagawa / Panasonic / Nikon / Sanyo Denki ⁵				✓		✓		
Incremental encoder ⁴ / SSI / EnDAT2.2 / BiSS-C / Tamagawa / Panasonic / Nikon / Sanyo Denki ⁵	√			✓	√			
None	✓			✓				
None		✓		✓				
None			✓			✓		

2.4.2 **Dual loop configurations**

The motor speed control loop is closed on one feedback connected on the motor while the motor position control loop is closed on the other available feedback which is placed on the load. There is usually a transmission between the load and the motor.

Motor sensor			Motor types			Load sensors	
Encoder ¹	Digital Halls	Linear Halls	Tacho	Brushless PMSM ²	Brushless BLDC ³	Brushed DC Voice coils	Encoder ⁶
Incremental encoder ⁴ / SSI / EnDAT2.2 / BiSS-C / Tamagawa / Panasonic / Nikon / Sanyo Denki ⁵				√		~	Incremental encoder ⁴ / SSI / EnDAT2.2 / BiSS-C / Tamagawa / Panasonic / Nikon / Sanyo Denki
Incremental encoder ⁴ / SSI / EnDAT2.2 / BiSS-C / Tamagawa / Panasonic / Nikon / Sanyo Denki ⁵	>			✓	✓		Incremental encoder ⁴ / SSI / EnDAT2.2 / BiSS-C / Tamagawa / Panasonic / Nikon / Sanyo Denki
None	>			✓			Incremental encoder ⁴ / SSI / EnDAT2.2 / BiSS-C / Tamagawa / Panasonic / Nikon / Sanyo Denki ⁷
None		>		√			Incremental encoder ⁴ / SSI / EnDAT2.2 / BiSS-C / Tamagawa / Panasonic / Nikon / Sanyo Denki ⁸
None			√			√	Incremental encoder ⁴ / SSI / EnDAT2.2 / BiSS-C / Tamagawa / Panasonic / Nikon / Sanyo Denki

Each defined motor type can have any combination of the supported feedbacks either on motor or on load.

Example: PMSM motor with Incremental encoder (from feedback #1) on motor and Incremental encoder (from feedback#2) on load

¹ Motor encoder can be either on Feedback 1 or on Feedback 2

² Sinusoidal. Brushless motor is controlled as PMSM using a field oriented control algorithm

Trapezoidal. Brushless motor is controlled as a BLDC motor using Hall-based commutation.

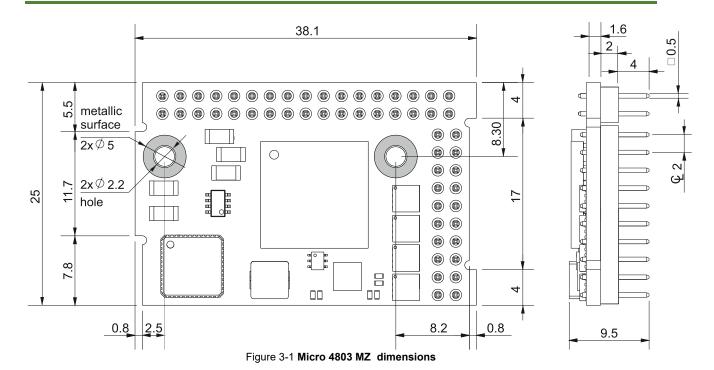
Single-ended or differential. Only differential on Feedback 2 for Micro 4803 CZ

SSI / EnDAT2.2 / BiSS-C / Tamagawa / Panasonic / Nikon / Sanyo Denki are differential, but single-ended option is also accepted Load encoder is on Feedback 2 / 1, if motor encoder is on Feedback 1 / 2

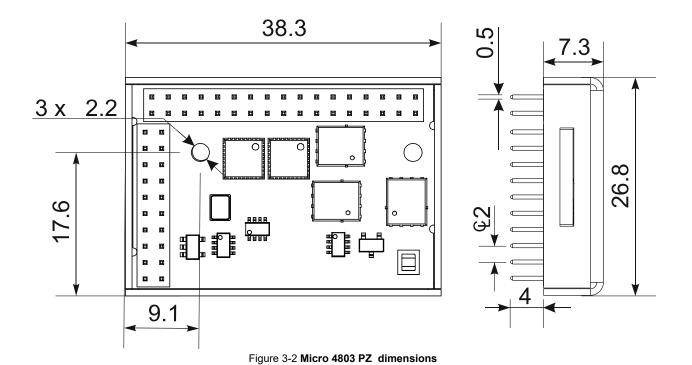
⁷ Load encoder can be only on Feedback 1

⁸ Load encoder can be only on Feedback 2

3.1 Micro 4803 MZ Dimensions



3.2 Micro 4803 PZ Dimensions



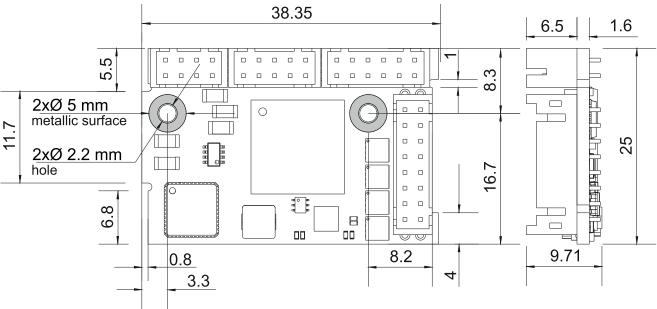


Figure 3-3 Micro 4803 HZ dimensions

3.4 Micro 4803 CZ Dimensions

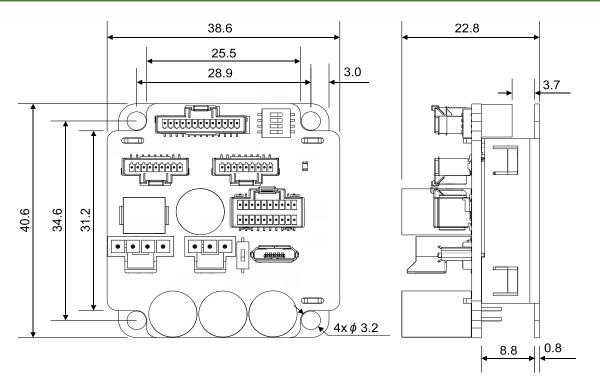


Figure 3-4 Micro 4803 CZ dimensions

3.5 Mechanical Mounting

The *Micro 4803 MZ/PZ* is intended to be mounted horizontally on a motherboard equipped with the recommended mating connectors, as specified in chapter 3.3.2.1. Motherboard PCB Design. Several drives can be hosted by a single motherboard.

The *Micro 4803 CZ/HZ* is intended to be mounted vertically or horizontally on a metallic support using the provided mounting holes and the recommended mating connectors.

The recommended inserts and screws for *Micro 4803 CZ* are:

Image	Connector	Description	Manufacturer	Part Number
	-	Self-clinching nuts M3	PennEngineering® (PEM®)	KF2-M3-ET
	-	Screws M3x10	Bossard	BN610-M3x10

The recommended inserts and screws for *Micro 4803 HZ* are:

Image	Connector	Description	Manufacturer	Part Number
	-	Self-clinching nuts M2	PennEngineering® (PEM®)	KF2-M2-ET
	-	Screws M2x10	Bossard	BN610-M2x10

For thermal calculations: the *Micro 4803* s can be assumed to generate 1.5 Watt (=5.1 BTU/hour) at idle, and up to 2.8 Watt (=9.5 BTU/hour) worst case while driving a motor.

3.5.1 Recommended spacing for Micro 4803 MZ/PZ/HZ

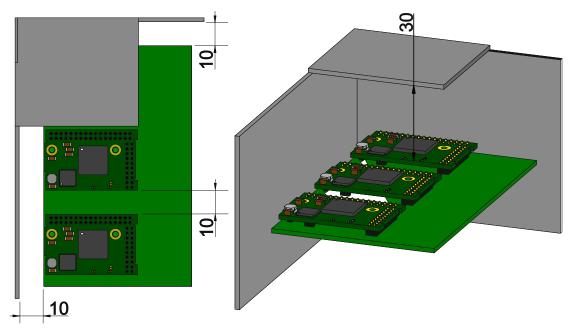
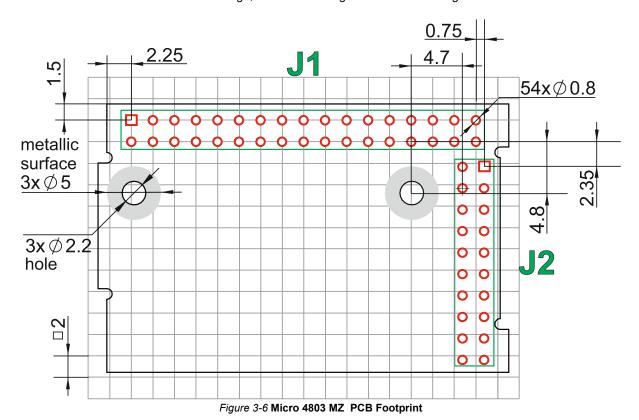


Figure 3-5 Recommended spacing - horizontal mounting, worst case: non-metallic, closed box (All dimension are expressed in mm)

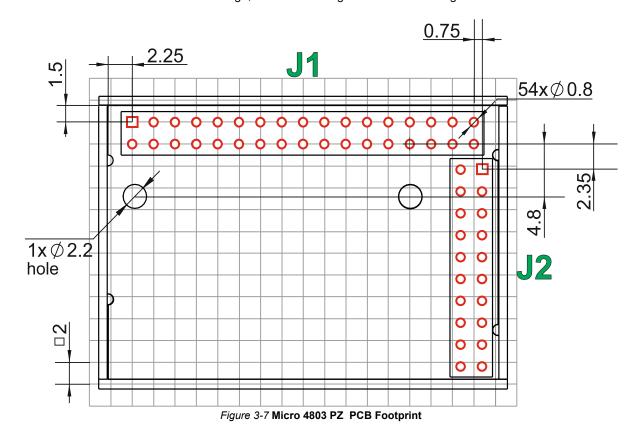
The figures above shows the minimum spacing to assure proper airflow by natural convection. If closed completely in a box, ventilation openings shall be foreseen on the top and bottom sides. If ventilation driven by natural convection is not enough to maintain the temperature surrounding the drives, then alternate forced cooling methods must be applied.

Remark: In case of using a metallic box, with ventilation openings, all spacing values may be reduced substantially. With proper ventilation, keeping the air surrounding the drive inside the limits indicated, the spacing values may be reduced down to zero.

For Micro 4803 MZ motherboard PCB design, use the following dimensional drawing:



For Micro 4803 PZ motherboard PCB design, use the following dimensional drawing:



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3.5.2.1 Motherboard PCB Design

It is recommended to use a multi-layer PCB for the motherboard, in order to have enough room for routing all the pins of the Micro 4803 MZ/PZ drives. Using a 2-layer PCB is possible when some of the pins remain unconnected.

The Micro 4803 MZ / Micro 4803 PZ drives are intended to be mounted on a mainboard. The recommended method of electrical connection is to use sockets on the mainboard. It is also possible to directly solder the module into the mainboard.

To secure the modules to the mainboard, it is recommended to have the mainboard equipped with 2 self-clinching nut inserts, with internal thread M2. The inserts will allow to use 2 screws M2x10, which will pull the module into the mainboard.

The recommended socket type, inserts and screws for Micro 4803 MZ/PZ are:

Image	Connector	Description	Manufacturer	Part Number
	14	2x17, 2.0mm THT (SMD) socket		SQW-117-01-F-D(-VS)
Participation of the second	J1	2x17, 2.0mm SMD pass-through socket	Samtec	CLT-117-02-F-D
this total	J2	2x10, 2.0mm THT (SMD) socket	Samiled	SQW-111-01-F-D(-VS)
	JZ	2x10, 2.0mm SMD pass-through socket		CLT-111-02-F-D
	-	Self-clinching nuts M2	PennEngineering® (PEM®)	KF2-M2-ET
	-	Screws M2x10	Bossard	BN610-M2x10

The 2 fixing holes shall provide a means to pull the Micro drive against the PCB. For example, use self-clinching nuts pressed onto the PCB on the bottom side. The Micro drive shall be pressed against the PCB using 2 screws M2x10, with head diameter not larger than 5mm (such as hexsocket head cap screws, colloquially also called "Inbus").

The fixing hardware shall be connected to system ground (GND), to improve thermal dissipation and EMC emissions.

3.5.2.2 Recommendations for the PCB Design

Below is a list of recommendations for the PCB design of the motherboard:

- Motor supply and motor outputs: use islands / areas of copper to escape connector area; this will maximize current capability. When using simple tracks, use at least 100mil cross section (75mil track width for 1oz/ft² copper thickness) – for Micro 4803 MZ / Micro 4803 PZ drives.
- Motor supply and ground return tracks between Micro 4803 MZ / Micro 4803 PZ drive and the nearby V_{MOT} decoupling capacitor are to be considered as EMI sources, and kept to a minimum length.
- Place the decoupling capacitors on V_{MOT} and V_{LOG} (see also 3.10 Power Supply Connection) as close as
 physically possible to the drive, to minimize EM radiated emissions. For un-shielded applications (no metallic
 box) and typical EMC regulations, the spacing between drive and capacitors must be less than 3
 centimeters.
- In multi-axis applications (multiple Micro 4803 MZ / Micro 4803 PZ drives on the same motherboard), it is
 preferable to have a separate decoupling capacitor for each drive's V_{MOT}. For V_{LOG} it is acceptable to share
 one decoupling capacitor for two drives.
- For stringent EMI requirements, it may be necessary to add common-mode filtering on the motor and/or logic supply inputs. Be sure to use 3-phase EMC filters, not 2-phase filters, in order to fulfill the basic requirement of zero common-mode current through the filter. This is necessary because the ground negative return is shared between V_{MOT} and V_{LOG}.
- Motor outputs shall be routed with parallel traces, and minimizing the loop area between these tracks. Avoid
 placing components above or below the motor output tracks, as these components may become effective
 antennas radiating EMI. If possible, route all 3 motor outputs in strip-line configuration (above or below a
 ground plane).
- For stringent EMI requirements, it may be necessary to add common-mode inductors on the motor outputs.
 Place these filters near the Micro 4803 MZ / Micro 4803 PZ drive, not near the external connector, to reduce radiation from the PCB tracks.
- Motor outputs must be separated from any nearby track (on the same layer) by a guard ring / track / area connected to ground. It is recommended to use the same guarding precaution also for tracks on nearby layers, i.e. use intermediate guard layer(s) connected to ground. The motor outputs must be treated as first

- source of noise on the motherboard. Second source of noise is the current flow between each drive and it's decoupling V_{MOT} capacitor.
- For best EMC performance, it is strongly recommended to provide an un-interrupted ground plane on one of the inner layers.
- All GND pins of the Micro 4803 MZ / Micro 4803 PZ drive are galvanically connected together on-board. If
 the motherboard provides an uninterrupted ground plane, it is recommended to connect all GND pins to the
 ground plane, and use the ground plane to distribute GND wherever needed. If the motherboard does not
 provide an uninterrupted ground plane, it is best to use each GND pin for its intended purpose. This will
 create local "star point" ground connection on-board each drive.
- For a multi-axis motherboard with one common power supply for all motors, each motor power supply return
 track shall be routed separately for each Micro 4803 MZ / Micro 4803 PZ drive, and star-point connected at
 the power supply terminal.
- The following signal pairs must be routed differentially, i.e. using parallel tracks with minimal loop area: A1+/DAT1+, A1-/DAT1-; B1+/CLK1+, B1-/CLK1-; Z1+, Z1-; A2+/DAT2+, A2-/DAT2-; B2+/CLK2+, B2 /CLK2-; CAN-Hi, CAN-Lo.
- When using +5V_{OUT} as supply for external devices (like encoders, Hall sensors, etc.) provide extra filtering
 and protection: use series resettable (PTC) fuses to add short-circuit protection; use transient absorbers to
 protect against ESD and over-voltage; add high-frequency filtering to protect against external noise injected
 on +5V_{OUT}.
- The outer box / case / cabinet must be connected to the motherboard ground either galvanically (directly) or through high-frequency decoupling capacitors, rated at an appropriate voltage.
- For PZ and CZ versions, the outer metallic shell of the drive is weakly connected to GND, but electrical
 contact cannot be guaranteed, so do not use this metallic shell for any electrical purpose. Its purpose is only
 for thermal dissipation, EMC shielding, ESD protection and mechanical/environmental protection.

3.5.2.3 EtherCAT signals PCB routing indications

3.5.2.3.1 PCB electrical Wiring calculations

$$Z_{DIFF} = \frac{174}{sqrt(1.41 + E_r)} \left(1 - 0.48e \left(-0.96 \frac{S}{H} \right) \right) \ln \left(\frac{5.98H}{0.8W + T} \right)$$

W = Width of the trace

H = Height of dielectric above the return plane

T = Trace thickness

S = Space between traces

E_r = Relative permittivity of the dielectric

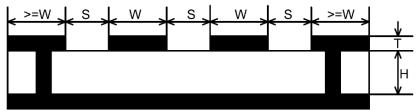
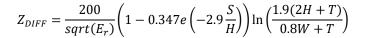


Figure 3-8 Microstrip Differential Impedance

For example:

$$\begin{cases} T = 17.5 \ microns \\ H = 175 \ microns \\ E_r = 4.8 (FR4) \rightarrow Z_{DIFF} = 100.6 \ \Omega \\ W = 8 mil \\ S = 7 \ mil \end{cases}$$



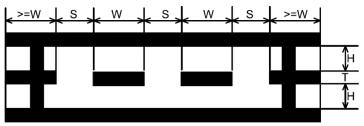


Figure 3-9 Stripline Differential Impedance

For example:

$$\begin{cases} T = 17.5 \ microns \\ H = 175 \ microns \\ E_r = 4.8(FR4) \rightarrow Z_{DIFF} = 100.2 \ \Omega \\ W = 4mil \\ S = 4 \ mil \end{cases}$$

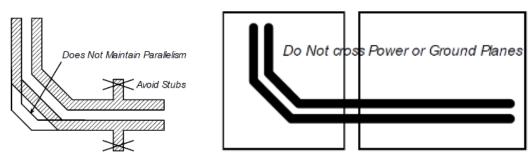


Figure 3-10 Stripline Differential Impedance

3.5.2.3.2 PCB EtherCAT routing indications applicable to Micro 4803 MZ/PZ version

- High-speed signals (Tx/Rx 0/1 +/-) must be routed as differential pairs, with controlled impedance, microstrip or stripline with 100 ohm differential characteristic impedance.
- Microstrip and stripline pairs shall be guarded on the same layer as the differential pair, with outer traces connected to the return plane by vias. The guarding traces shall form preferably a closed ring, wherever possible.
- Use above formulae (or other method) to calculate microstrip or stripline differential impedance
- Avoid stubs, crossovers and vias on high-speed signals. Vias present impedance discontinuities and should be avoided. Route an entire differential pair trace on a single layer if possible.
- High-speed signals should not be run such that they cross a plane split. A signal crossing a plane split may
 cause unpredictable return path currents and would likely impact signal quality, also potentially creating EMI
 problems.
- The center tap of the magnetics non-isolated winding (connected to drive) shall be connected to J1 dedicated GND pins 15 and 16. Avoid using these two pins for other purposes, such as connecting them to the system-wide ground plane, because this may create unwanted voltage drops affecting quality of EtherCAT signals. For example, do not use these two pins to carry motor supply current, which contains harmful harmonics in the frequency range of EtherCAT signals. Practically, keep these two connections isolated from system GND.
- Return plane(s) for differential signals shall be connected to J1 dedicated GND pins 15 and 16. If possible, keep these local return plane(s) isolated from each other, and mandatorily keep them isolated from system-wide GND plane. Maintaining isolation between port 0 and port 1 local return planes is optimal for noise rejection. If this is not possible due to routing constraints, then strap the pins near the drive, but always keep this local return plane(s) separate from GND plane, to avoid circulating currents from power supply(ies).
- The center tap of the magnetics isolated winding has a "Bob Smith" termination to system ground. "Bob Smith" termination is used to reduce noise resulting from common-mode current flows, as well as reduce susceptibility to any noise from unused wire pairs on the RJ45.
- "Bob Smith" termination is different depending on Power Over Ethernet (PoE) compliance. PoE carries up to 57V between pairs, which would destroy the 75ohm terminating resistors if DC blocking capacitors of 10nF are not in place.

- Capacitor 1nF 2KV must sustain 1.5KVrms for 1 minute as per IEEE802.3. The 1Meg discharge resistor may be destroyed during this hi-pot testing.
- For enhanced EMC immunity it is possible to add surge protectors on the high-speed signals, on the isolated side of the magnetics (not across pins, there is DC current flowing through windings). Check that signals are not affected by the added parasitic capacitance.
- Use magnetics with integrated common-mode choking devices. Use magnetics compatible with Auto MDI/MDI-X (with symmetrical windings). Use metal shielded connectors, and connect the shield to device chassis / PE.
- Do not run any signals under the magnetics this could cause unwanted noise crosstalk. Likewise void the planes under magnetics, this will help prevent common-mode noise coupling.
- To save board space and reduce component count, RJ45 connectors with integrated magnetics may be used. Check the PoE compliance where applicable.
- It is recommended to use magnetics in between two drives mounted on the same mainboard PCB, as shown in *Figure 3-13* EtherCAT wiring for Micro 4803 MZ and Micro 4803 PZ drives.
- It is NOT recommended to directly connect two modules on the same PCB via EtherCAT over a very short distance without using magnetics. This method is NOT recommended because it is very sensitive to the design quality of the mainboard, specifically to the voltage difference between drives' ground potential (ground bounce), which can lead to packet loss when PCB design is not done correctly. So, we do NOT encourage this approach. But technically this is feasible. Direct (galvanic) connection, without any extra components, between Rx and Tx, will work (the Micro 4803 has on-board DC blocking capacitors series with all EtherCAT signals). For an error-free direct-connection, follow the following PCB design rules:
 - o Make sure you use one (or preferably more) GND plane(s) on the mainboard, to minimize ground voltage difference between boards.
 - Make sure you use isolated local return plane(s) to implement stripline or microstrip, controlledimpedance, differential routing of the high-speed Ethernet signals.
 - Do not use the local return plane(s), which implements stripline / microstrip, to carry current, for example as ground return for V_{MOT}.
- A possible method is to connect the local return plane(s) using capacitors of 10nF...22nF, connected at both
 ends (drives) of the local return plane(s). This will break the unwanted current paths, while keeping the highfrequency return path.

3.5.2.3.3 EtherCAT Bus connection

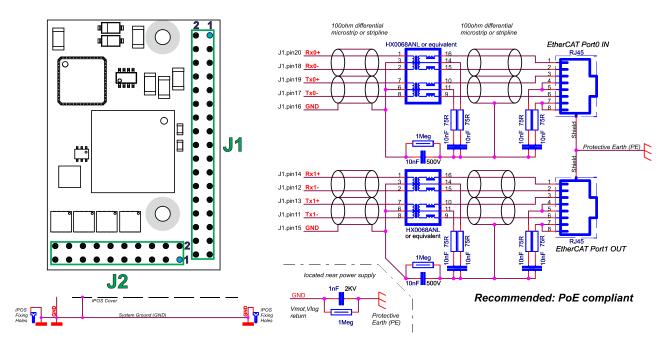


Figure 3-11 EtherCAT bus to RJ45 connection PoE compliant

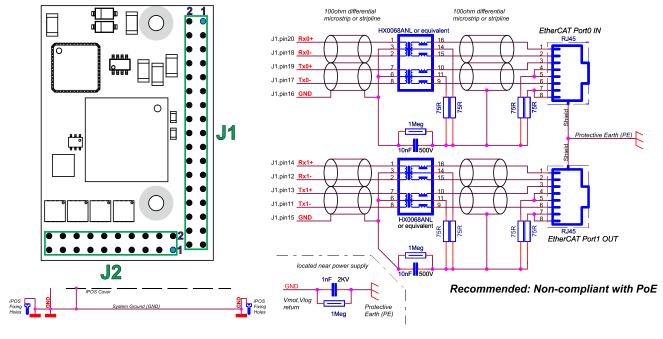


Figure 3-12 EtherCAT bus to RJ45 connection non-compliant with PoE

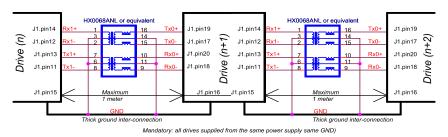
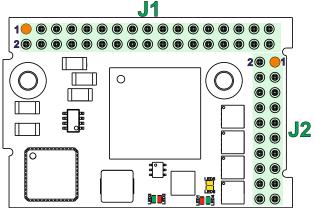


Figure 3-13 EtherCAT wiring for Micro 4803 MZ and Micro 4803 PZ drives

For additional details regarding signal swapping, please check the EtherCAT signals schematic considerations chapter.

3.6.1 Pinouts for Micro 4803 MZ/PZ

iPOS4803 MZ

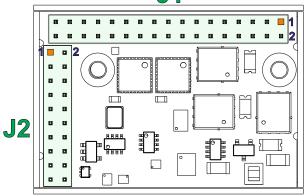


Pins facing downwards view

J1

1 +Vlog Positive terminal of the logic supply input: 6 to 48 VDC 2 A Phase A for 3-ph motors, Motor+ for DC brush motors 3 GND Ground return for logic supply 4 B Phase B for 3-ph motors, Motor- for DC brush motors 5 GND Shield for motor windings cable 6 C Phase C for 3-ph motors 7 +Vmot Positive terminal of the motor supply: 7 to 48 VDC 8 Rsvd. Reserved. 9 BFS Connect to GND to perform a firmware update after a critical firmware failure 10 ID2 AxisID² selection pin. See AxisID selection chapter for more details. 11 TX1- Transmit/Receive negative, OUT port. Connect to magnetics PHY TX1 or directly to nearby TX0- 12 RX1- Receive/Transmit negative, OUT port. Connect to magnetics PHY RX1 or directly to nearby TX0- 13 TX1+ Receive Pransmit positive, OUT port. Connect to magnetics PHY TX1 or directly to nearby TX0- 14 RX1+ Receive/Transmit positive, OUT port. Connect to magnetics PHY RX1 or directly to nearby TX0+ 15 GND Ground shield for port 1 16 GND Ground shield for port 0 17 TX0- Transmit/Receive negative, IN port. Connect to magnetics PHY TX0 or directly to nearby TX1- 18 RX0- Receive/Transmit negative, IN port. Connect to magnetics PHY TX0 or directly to nearby TX1- 19 TX0+ Receive/Transmit negative, IN port. Connect to magnetics PHY RX0 or directly to nearby TX1- 20 RX0+ Receive/Transmit positive, IN port. Connect to magnetics PHY TX0 or directly to nearby TX1+ 21 ID0 AxisID³ selection pin. See AxisID selection chapter for more details. 22 ID1 AxisID¹ selection pin. See AxisID selection chapter for more details. 23 232TX RS-232 Data Transmission. 24 232RX RS-232 Data Transmission. 25 CAN Hi CAN-Bus negative line (dominant high) Not functional for CAT drives 10 IN2/LSP 5-60V digital NPN input. Positive limit switch input 28 IN3/LSN 5-60V digital NPN input. Drive Enable input 29 IN5/Enable 5-60V digital NPN input. Drive Enable input 30 I/00 NPN 1.5A output OUT0 31 I/01 S-50V NPN general-purpose digital programmable input IN0 /or NPN 0.1A output OUT1	Pin	Name	Description	
2 A Phase A for 3-ph motors, Motor+ for DC brush motors 3 GND Ground return for logic supply 4 B Phase B for 3-ph motors, Motor- for DC brush motors 5 GND Shield for motor windings cable 6 C Phase C for 3-ph motors 7 +Vmot Positive terminal of the motor supply: 7 to 48 VDC 8 Rsvd. Reserved. 9 BFS Connect to GND to perform a firmware update after a critical firmware failure 10 ID2 AxisID* selection pin. See AxisID selection chapter for more details. 11 TX1- Transmit/Receive negative, OUT port. Connect to magnetics PHY TX1 or directly to nearby RX0-Receive/Transmit negative, OUT port. Connect to magnetics PHY TX1 or directly to nearby RX0-Receive/Transmit positive, OUT port. Connect to magnetics PHY TX1 or directly to nearby RX0+Receive/Transmit positive, OUT port. Connect to magnetics PHY TX1 or directly to nearby RX0+Receive/Transmit positive, OUT port. Connect to magnetics PHY TX1 or directly to nearby RX0+Receive/Transmit positive, IN port. Connect to magnetics PHY TX0 or directly to nearby RX1-Receive/Transmit negative, IN port. Connect to magnetics PHY TX0 or directly to nearby TX1-Transmit/Receive positive, IN port. Connect to magnetics PHY TX0 or directly to nearby TX1-Receive/Transmit positive, IN port. Connect to magnetics PHY TX0 or directly to nearby TX1-Receive/Transmit positive, IN port. Connect to magnetics PHY TX0 or directly to nearby TX1-Receive/Transmit positive, IN port. Connect to magnetics PHY TX0 or directly to nearby TX1-Receive/Transmit positive, IN port. Connect to magnetics PHY TX0 or directly to nearby TX1-Receive/Transmit positive, IN port. Connect to magnetics PHY TX0 or directly to nearby TX1-Receive/Transmit positive, IN port. Connect to magnetics PHY TX0 or directly to nearby TX1-Receive/Transmit positive, IN port. Connect to magnetics PHY TX0 or directly to nearby TX1-Receive/Transmit positive, IN port. Connect to magnetics PHY TX0 or directly to nearby TX1-Receive/Transmit positive, IN port. Connect to magnetics PHY TX0 or directly to nearby TX1-Receive/Transmit positive, IN por			<u> </u>	VDC
3 GND Ground return for logic supply 4 B Phase B for 3-ph motors, Motor- for DC brush motors 5 GND Shield for motor windings cable 6 C Phase C for 3-ph motors 7 +Vmot Positive terminal of the motor supply: 7 to 48 VDC 8 Rsvd. Reserved. 9 BFS Connect to GND to perform a firmware update after a critical firmware failure 10 ID2 AxisID ² selection pin. See AxisID selection chapter for more details. 11 TX1- Ground Frammit Receive negative, OUT port. Connect to magnetics PHY TX1 or directly to nearby RX0-Receive/Transmit negative, OUT port. Connect to magnetics PHY TX1 or directly to nearby RX0-Receive/Transmit positive, OUT port. Connect to magnetics PHY TX1 or directly to nearby RX0-Receive/Transmit positive, OUT port. Connect to magnetics PHY TX1 or directly to nearby RX0-Receive/Transmit positive, OUT port. Connect to magnetics PHY TX1 or directly to nearby RX0-Receive/Transmit positive, IN port. Connect to magnetics PHY TX0 or directly to nearby RX1-Receive/Transmit negative, IN port. Connect to magnetics PHY TX0 or directly to nearby RX1-Receive/Transmit positive, IN port. Connect to magnetics PHY TX0 or directly to nearby RX1-Receive/Transmit positive, IN port. Connect to magnetics PHY TX0 or directly to nearby RX1-Receive/Transmit positive, IN port. Connect to magnetics PHY TX0 or directly to nearby RX1-Receive/Transmit positive, IN port. Connect to magnetics PHY TX0 or directly to nearby RX1+Receive/Transmit positive, IN port. Connect to magnetics PHY RX0 or directly to nearby RX1+Receive/Transmit positive, IN port. Connect to magnetics PHY RX0 or directly to nearby RX1+Receive/Transmit positive, IN port. Connect to magnetics PHY RX0 or directly to nearby RX1+Receive/Transmit positive, IN port. Connect to magnetics PHY RX0 or directly to nearby RX1+Receive/Transmit positive, IN port. Connect to magnetics PHY RX0 or directly to nearby RX1+Receive/Transmit positive, IN port. Connect to magnetics PHY RX0 or directly to nearby RX1+Receive/Transmit positive, IN port. Connect to magnetics PHY RX0 port positive, I	_			
4 B Phase B for 3-ph motors, Motor- for DC brush motors 5 GND Shield for motor windings cable 6 C Phase C for 3-ph motors 7 +Vmot Positive terminal of the motor supply: 7 to 48 VDC 8 Rsvd. Reserved. 9 BFS Connect to GND to perform a firmware update after a critical firmware failure 10 ID2 AxisID² selection pin. See AxisID selection chapter for more details. 11 TX1- Transmit/Receive negative, OUT port. Connect to magnetics PHY TX1 or directly to nearby RX0-Receive/Transmit negative, OUT port. Connect to magnetics PHY RX1 or directly to nearby RX0-Receive/Transmit positive, OUT port. Connect to magnetics PHY TX1 or directly to nearby RX0-Tx1-Tx1-Tx1-Tx1-Tx1-Tx1-Tx1-Tx1-Tx1-Tx1	_			0.010
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23 232TX RS-232 Data Transmission. 24 232RX RS-232 Data Reception. 25 CAN Hi CAN-Bus positive line (dominant high) Not functional for CAT drives 26 CAN Lo CAN-Bus negative line (dominant low) for CAT drives 27 IN2/LSP 5-60V digital NPN input. Positive limit switch input 28 IN3/LSN 5-60V digital NPN input. Negative limit switch input 29 IN5/Enable 5-60V digital NPN input. Drive Enable input 30 I/O0 5-50V NPN general-purpose digital programmable input IN0 /or NPN 1.5A output OUT0 31 I/O1 5-50V NPN general-purpose digital programmable input IN1 / or NPN 0.1A output OUT1 32 I/O4 5-50V NPN general-purpose digital programmable input IN4 / or NPN 0.1A output OUT4 33 GND Ground return and shield	21	ID0	AxisID ⁰ selection pin. See AxisID selection chapte	r for more details.
24 232RX RS-232 Data Reception. 25 CAN Hi CAN-Bus positive line (dominant high) Not functional for CAT drives 26 CAN Lo CAN-Bus negative line (dominant low) for CAT drives 27 IN2/LSP 5-60V digital NPN input. Positive limit switch input 28 IN3/LSN 5-60V digital NPN input. Negative limit switch input 29 IN5/Enable 5-60V digital NPN input. Drive Enable input 30 I/O0 5-50V NPN general-purpose digital programmable input IN0 /or NPN 1.5A output OUT0 31 I/O1 5-50V NPN general-purpose digital programmable input IN1 / or NPN 0.1A output OUT1 32 I/O4 5-50V NPN general-purpose digital programmable input IN4 / or NPN 0.1A output OUT4 33 GND Ground return and shield	22	ID1	AxisID¹ selection pin. See AxisID selection chapte	r for more details.
25 CAN HI CAN-Bus positive line (dominant high) 26 CAN Lo CAN-Bus negative line (dominant low) 27 IN2/LSP 5-60V digital NPN input. Positive limit switch input 28 IN3/LSN 5-60V digital NPN input. Negative limit switch input 29 IN5/Enable 5-60V digital NPN input. Drive Enable input 30 I/O0 S-50V NPN general-purpose digital programmable input IN0 /or NPN 1.5A output OUT0 31 I/O1 S-50V NPN general-purpose digital programmable input IN1 / or NPN 0.1A output OUT1 32 I/O4 Ground return and shield	23	232TX	RS-232 Data Transmission.	
26 CAN Lo CAN-Bus negative line (dominant low) for CAT drives 27 IN2/LSP 5-60V digital NPN input. Positive limit switch input 28 IN3/LSN 5-60V digital NPN input. Negative limit switch input 29 IN5/Enable 5-60V digital NPN input. Drive Enable input 30 I/O0 NPN general-purpose digital programmable input IN0 /or NPN 1.5A output OUT0 31 I/O1 5-50V NPN general-purpose digital programmable input IN1 / or NPN 0.1A output OUT1 32 I/O4 5-50V NPN general-purpose digital programmable input IN4 / or NPN 0.1A output OUT4 33 GND Ground return and shield	24	232RX	RS-232 Data Reception.	
27 IN2/LSP 5-60V digital NPN input. Positive limit switch input 28 IN3/LSN 5-60V digital NPN input. Negative limit switch input 29 IN5/Enable 5-60V digital NPN input. Drive Enable input 30 I/O0 5-50V NPN general-purpose digital programmable input IN0 /or NPN 1.5A output OUT0 31 I/O1 5-50V NPN general-purpose digital programmable input IN1 / or NPN 0.1A output OUT1 32 I/O4 5-50V NPN general-purpose digital programmable input IN4 / or NPN 0.1A output OUT4 33 GND Ground return and shield	25	CAN Hi	CAN-Bus positive line (dominant high)	
28 IN3/LSN 5-60V digital NPN input. Negative limit switch input 29 IN5/Enable 5-60V digital NPN input. Drive Enable input 30 I/O0 5-50V NPN general-purpose digital programmable input IN0 /or NPN 1.5A output OUT0 31 I/O1 5-50V NPN general-purpose digital programmable input IN1 / or NPN 0.1A output OUT1 32 I/O4 5-50V NPN general-purpose digital programmable input IN4 / or NPN 0.1A output OUT4 33 GND Ground return and shield	26	CAN Lo	CAN-Bus negative line (dominant low)	for CAT drives
29 IN5/Enable 5-60V digital NPN input. Drive Enable input 30 I/O0 5-50V NPN general-purpose digital programmable input IN0 /or NPN 1.5A output OUT0 31 I/O1 5-50V NPN general-purpose digital programmable input IN1 / or NPN 0.1A output OUT1 32 I/O4 5-50V NPN general-purpose digital programmable input IN4 / or NPN 0.1A output OUT4 33 GND Ground return and shield	27	IN2/LSP	5-60V digital NPN input. Positive limit switch input	t
30 I/O0 5-50V NPN general-purpose digital programmable input IN0 /or NPN 1.5A output OUT0 31 I/O1 5-50V NPN general-purpose digital programmable input IN1 / or NPN 0.1A output OUT1 32 I/O4 5-50V NPN general-purpose digital programmable input IN4 / or NPN 0.1A output OUT4 33 GND Ground return and shield	28		· · · · · · · · · · · · · · · · · · ·	ut
30 NPN 1.5A output OUT0 31 I/O1 S-50V NPN general-purpose digital programmable input IN1 / or NPN 0.1A output OUT1 32 I/O4 S-50V NPN general-purpose digital programmable input IN4 / or NPN 0.1A output OUT4 33 GND Ground return and shield	29	IN5/Enable		
NPN 0.1A output OUT1 NPN 0.1A output OUT1 104 NPN 0.1A output OUT1 NPN 0.1A output OUT4 NPN 0.1A output OUT4 Cround return and shield	30	1/00	NPN 1.5A output OUT0	,
NPN 0.1A output OUT4 33 GND Ground return and shield	31	I/O1	5-50V NPN general-purpose digital programmable input IN1 / or NPN 0.1A output OUT1	
	32	1/04	5-50V NPN general-purpose digital programmable input IN4 / or	
34 Analogin Analog input (range software selectable 0-5V or ±10V)	33	GND	Ground return and shield	
	34	Analogin	Analog input (range software selectable 0-5V or ±	:10V)

iPOS4803 PZ



Pins facing upwards view

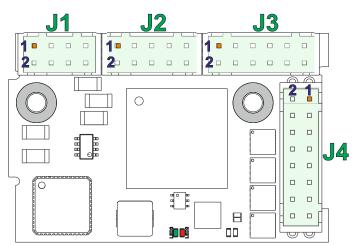
J2

Pin	Name	Description
1	+V USB	5V input from USB
2	GND	Ground return for USB
3	Hall1	Digital Hall, or Linear Hall sensor 1
4	Hall2	Digital Hall, or Linear Hall sensor 2
5	Hall3	Digital Hall, or Linear Hall sensor 3
6	GND	Ground return and shield
7	+5V	Supply for all feedback sensors
8	GND	Ground return and shield
9	EncA1+/EncA1/ Dt1+/Dt1	Encoder 1 A+/Data+ diff. input or single-ended input
10	EncA1-/Dt1-	Encoder 1 A-/Data- diff. input. Leave open for single-ended; Add externally 120 Ω to pin 9 for differential
11	EncB1+/EncB1/ Clk1+/Clk1	Encoder 1 B+/Clock+ diff. input or single-ended input
12	EncB1/ Clk1-	Encoder 1 B-/Clock- diff. input. Leave open for single-ended; Add externally 120 Ω to pin 11 for differential
13	EncA2+/EncA2/ Dt2+/Dt2	Encoder 2 A+/Data+ diff. input or single-ended input
14	EncA2-/Dt2-	Encoder 2 A-/Data- diff. input. Leave open for single-ended; Add externally 120 $\!\Omega$ to pin 13 for differential
15	EncB2+/EncB2/ Clk2+/Clk2	Encoder 2 B+/Clock+ diff. input or single-ended input
16	EncB2-/ Clk2-	Encoder 2 B-/Clock- diff. input. Leave open for single-ended; Add externally 120 $\!\Omega$ to pin 15 for differential
17	Z1+	Encoder 1 Z+ diff. input or single-ended input
18	Z1-	Encoder 1 Z- diff. input. Leave open for single-ended; Add externally 120Ω to pin 17 for differential
19	USB DM	USB data-
20	USB DP	USB data+

LEDs

No.	Name	Color	Description
LED1	ECAT ERR	RED	EtherCAT® ERROR indicator.
LED2	TML ERR	RED	Turned on when the drive detects an error condition.
LED3	TML RDY	GREEN	Lit after power-on when the drive initialization ends. Turned off when an error occurs.
LED4	ECAT RUN	GREEN	EtherCAT® RUN indicator.
LED5	ECAT ACTO	YELLOW	Shows the state of the physical link and
LED6	ECAT ACT1	YELLOW	activity for ECAT IN and OUT ports.
The LE	D1, LED4, LED	5, LED6 is r	not used for iPOS4803P-CAN drive
The LEDs are not accessible for any iPOS4803PE drive			

iPOS4803 HZ



J4

Pin	Name	Description
1	Hall1	Digital Hall, or Linear Hall sensor 1
2	Hall2	Digital Hall, or Linear Hall sensor 2
3	Hall3	Digital Hall, or Linear Hall sensor 3
4	GND	Ground return and shield
5	+5V	Supply for all feedback sensors
6	GND	Ground return and shield
7	EncA1+/ EncA1/Data1+ /Data1	Encoder 1 A / data positive (or single-ended)
8	EncA1-/Data1-	Leave open for single-ended; Add externally 120Ω to pin 7 for differential
9	EncB1+/ EncB1/Clock1 +/Clock1	Encoder 1 B / clock positive (or single-ended)
10	EncB1/ Clock1-	Leave open for single-ended; Add externally 120Ω to pin 9 for differential
11	EncA2+/ EncA2/Data2+ /Data2	Encoder 2 A / data positive (or single-ended)
12	EncA2-/Data2-	Leave open for single-ended; Add externally 120Ω to pin 11for differential
13	EncB2+/ EncB2/Clock2 +/Clock2	Encoder 2 B / clock positive (or single-ended)
14	EncB2-/ Clock2-	Leave open for single-ended; Add externally 120 Ω to pin 13 for differential
15	Z1+	Incr. encoder1 Z single-ended or Z+ diff. input
16	Z1-	Leave open for single-ended; Add externally 120 $\!\Omega$ to pin 15 for differential

J1

Pin	Name	Description
1	+Vlog	Positive terminal of the logic supply input: 6 to 48 VDC
2	Α	Phase A for 3-ph motors, Motor+ for DC brush motors
3	GND	Ground return for logic supply
4	В	Phase B for 3-ph motors, Motor- for DC brush motors
5	GND	Shield for motor windings cable
6	С	Phase C for 3-ph motors
7	+Vmot	Positive terminal of the motor supply: 7 to 48 VDC
8	Rsvd.	Reserved. Do not connect.

J2

Pin	Name	Description
14	Rsvd.	Reserved. Do not connect.
5,6	GND	Ground shield
710	Rsvd.	Reserved. Do not connect.

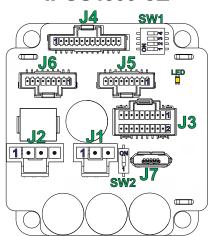
J3

Pin	Name	Description
1	232TX	RS-232 Data Transmission. Alternative to EtherCAT
2	232RX	RS-232 Data Reception. Alternative to EtherCAT
3	CAN Hi	CAN-Bus positive line (dominant high)
4	CAN Lo	CAN-Bus negative line (dominant low)
5	LSP	5-60V digital NPN input. Positive limit switch input
6	LSN	5-60V digital NPN input. Negative limit switch input
7	Enable	5-60V digital NPN input. Drive Enable input
8	I/O0	5-50V NPN general-purpose digital programmable input /or NPN 1.5A output
9	I/O1	5-50V NPN general-purpose digital programmable input / or NPN 0.1A output
10	I/O4	5-50V NPN general-purpose digital programmable input / or NPN 0.1A output
11	GND	Ground return and shield
12	Analogin	Analog input software selectable (0-5V or ±10V)

LEDs

No.	Name	Color	Description
LED2	TML ERR	RED	Turned on when the drive detects an error condition.
LED3	TML RDY	GREEN	Lit after power-on when the drive initialization ends. Turned off when an error occurs.

iPOS4803 CZ



J1

Pin	Name	Description
1	+Vmot	Positive terminal of the motor supply: 7 to 48 V _{DC} .
2	GND	Ground return.
3	+Vlog	Positive terminal of the logic supply input: 6 to 48 V _{DC} .

J2

Pin	Name	Description
1	Α	Phase A for 3-ph motors, Motor+ for DC brush motors.
2	В	Phase B for 3-ph motors, Motor- for DC brush motors.
3	С	Phase C for 3-ph motors.
4	GND	Ground return.

J3

_						
Pin	Name	Description				
1	GND	Ground return.				
2	Hall1 / LH1	Digital Hall, or Linear Hall sensor 1.				
3	+5V	5V supply for all feedback sensors.				
4	Hall2 / LH2	Digital Hall, or Linear Hall sensor 2.				
5	+5V	5V supply for all feedback sensors.				
6	Hall3 / LH3	Digital Hall, or Linear Hall sensor 3.				
7	EncA1+/EncA1 Dt1+/Dt1	Encoder 1 A / Data+; set SW1 pin 1 for differential.				
8	GND	Ground return.				
9	EncA1-/Dt1-	Encoder 1 A-/Data- diff. input.; set SW1 pin 1 for differential.				
10	+5V	5V supply for all feedback sensors.				
11	EncB1+/EncB1 Clk1+/Clk1	Encoder 1 B+ / Clock positive; set SW1 pin 2 for differential.				
12	EncA2+/EncA2 Dt2+/Dt2	2 Incr. encoder 2 A+ diff. input, or Pulse+, or Data+ for SSI, or Slave+ for BiSS; has 120Ω resistor between pins 12 and 14.				
13	EncB1/ Clk1-	Encoder 1 B- / Clock- diff. input.; set SW1 pin 2 for differential.				
14	EncA2-/Dt2-	Incr. encoder 2 A- diff. input, or Pulse-, or Data- for SSI, or Slave- for BiSS; has 120Ω resistor between pins 12 and 14.				
15	Z1+	Incr. encoder 1 Z single-ended or Z+ diff. input; set SW1 pin 3 for differential.				
16	EncB2+/EncB2 Clk2+/Clk2	Incr. encoder 2 B+ diff. input, or Dir+-, or Clock+ for SSI, or Master+ for BiSS; has internal 120Ω resistor between pins 16 and 18.				
17	Z1-	Leave open for single-ended; set SW1 pin 3 for differential.				
18	EncB2- Clk2-	Incr. encoder 2 B- diff. input, or Dir, or Clock- for SSI, or Master- for BiSS; has internal 120Ω resistor between pins 16 and 18.				
19	GND	Ground return.				
20	+Vlog	Positive terminal of the logic supply: 6 to 48 V _{DC} .				

J7

Pin	Name	Description				
1	+V USB	USB supply.				
2	USB DM	USB data				
3	USB DP	USB data+.				
4	Rsvd	Reserved. Do not connect.				
5	GND	Ground return.				
6	SHELL	Internally connected to pin 5 of J7.				

The LED (yellow) shows the status of the drive that its logic is supplied

J4

Pin	Name	Description				
1	232TX	RS-232 Data Transmission.				
2	232RX	RS-232 Data Reception.				
3	GND	Ground return.				
4	+Vlog	Positive terminal of the logic supply input: 6 to 48 V _{DC} .				
5	IN2/LSP 5-60V digital NPN input. Positive limit switch input.					
6	IN3/LSN 5-60V digital NPN input. Negative limit switch input.					
7	1/00	5-50V NPN general-purpose digital programmable input IN0 /or NPN 1.5A output OUT0.				
8	I/O1	5-50V NPN general-purpose digital programmable input IN1 / or NPN 0.1A output OUT1.				
9	5-50V NPN general-purpose digital programmable input NPN 0.1A output OUT4.					
10	IN5/Enable	5-60V digital NPN input. Drive Enable input.				
11	GND	Ground return.				
12	Analogin	Analog input (range software selectable 0-5V or ±10V)				
13	+5V	Supply for all feedback sensors.				

J5

Pin	Name	Description				
1	GND	Ground return.				
2	CAN Hi	CAN-Bus positive line (dominant high)				
3	CAN Lo	N Lo CAN-Bus negative line (dominant low)				
4	Rsvd	Rsvd Reserved. Do not connect.				
5	SHIELD 0	HIELD 0 Shield connection for ECAT IN port. Connect directly to RJ45 shield.				
6	TX0+	Transmit/Receive positive, ECAT IN port. Connect directly to RJ45 pin1.				
7	Transmit/Receive negative, ECAT IN port. Connect dir RJ45 pin2.					
8	RX0+ Receive/Transmit positive, ECAT IN port. Connect directly to RJ45 pin3.					
9	RX0-	Receive/Transmit negative, ECAT IN port. Connect directly to RJ45 pin6.				

J6

Pin	Name	Description				
1	GND	Ground return.				
2	CAN Hi	i CAN-Bus positive line (dominant high)				
3	CAN Lo	O CAN-Bus negative line (dominant low)				
4	Rsvd	Rsvd Reserved. Do not connect.				
5	SHIELD 1 Shield connection for ECAT OUT port. Connect directly to RJ45 shield.					
6	TX1+	Transmit/Receive positive, ECAT OUT port. Connect directly to RJ45 pin1.				
7	TX1-	Transmit/Receive negative, ECAT OUT port. Connect directly to RJ45 pin2.				
8	RX1+	Receive/Transmit positive, ECAT OUT port. Connect directly to RJ45 pin3.				
9	RX1-	Receive/Transmit negative, ECAT OUT port. Connect directly to RJ45 pin6.				

SW

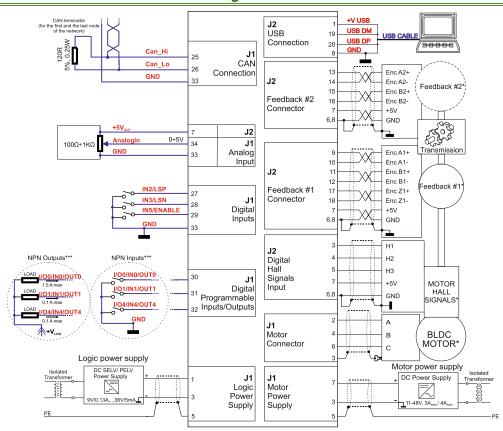
For iPOS4803S-CAT						
SW1 - Axis	SW1 – Axis ID and Feedback Resistors selection					
Position	Description					
1	ON = Connect an 120Ω resistor between EncA1-/Dt1- and					
•			1 feedback pins.			
2	ON = Connect an 120Ω resistor between EncB1/Clk1- and					
	EncB1+/En	cB1/Clk1+/C	lk1 feedback pins.			
3	ON = Conn	ect an 120Ω	resistor between Z1- and Z1+ feedback pins.			
SW1 – P	AxisID					
OI	==	OFF	255, the EtherCAT register called "configured			
0.	•	OFF	station alias" will be 0			
OI	OFF		1			
0	ON		128			
ON		ON	129			

For iPOS4803S-CAN							
SW1 - Axis	SW1 – Axis ID and Feedback Resistors selection						
Position	Description						
1	ON = Connect an 120Ω resistor between EncA1-/Dt1- and EncA1+/EncA1/Dt1+/Dt1 feedback pins.						
2	ON = Connect an 120Ω resistor between EncB1/Clk1- and EncB1/EncB1/Clk1+/Clk1 feedback pins.						
3	ON = Connect an 120Ω resistor between Z1- and Z1+ feedback pins.						
4	ON = AxisID is set as 1 OFF = AxisID is set as 255. If the CANOpen mode is selected (SW2 pin 1 is OFF) and the AxisID value is 255. drive will be in "LSS inactive" state.						
SW2 - CANOpen / TMLCAN selection							
1	ON = TMLCAN mode is selected OFF = CANOpen mode is selected						

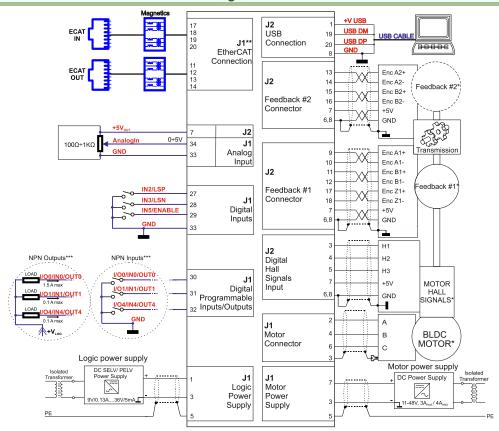
3.6.4 Mating Connectors for Micro 4803 CZ

Image	Connector	Description		Manufacturer	Part Number	Image
	J1	1x3 Nano-Fit, 2.50mm Pitch Nano-Fit Wire-to-Board Housing, 3 circuits		Molex	1053071203	
	J2	1x4 Nano-Fit, Board Housin	2.50mm Pitch Nano-Fit Wire-to- g, 4 circuits	Molex	1053071204	
220	J3	2x10 Pico-Clasp, 1.00mm Pitch Pico-Clasp Wire-to-Board Housing, 20 Circuits		Molex	5011892010	
A A DECEMBER A DECEMBE	J4		1x13 Pico-Clasp, 1.00mm Pitch Pico-Clasp Wire-to-Board Housing, 13 Circuits		5013301300	<u>исвавании ве</u>
	J5, J6		p, 1.00mm Pitch Pico-Clasp I Housing, 9 Circuits	Molex	5013300900	100
BEGINARE	J7	USB cable, Cable USB A Male - Micro B Male, 1m, shielded, black, 9.6mm plastic width		Tensility International Corp	1002333	
	J1, J2	Pre-Crimped wires for Nano-Fit	Cable Assembly, Nano-Fit Crimp Terminal Socket to Nano-Fit Crimp Terminal Socket, 300mm	Molex	0797582140	11
	J3, J4, J5, J6	Pre-Crimped wires for Pico-Clasp	Cable Assembly, Pico-Clasp Crimp Terminal Socket to Pico-Clasp Crimp Terminal Socket, 300mm	Molex	0797581019	
	J1, J2	Pins for Nano-Fit	Nano-Fit Crimp Terminal, Female, 0.76µm Gold (Au) Plating, Lubricated, 24-26 AWG	Molex	1053001400	
	J3, J4, J5, J6	Pins for Pico-Clasp	1.00mm Pitch, Pico-Clasp Female Crimp Terminal, Gold Plating 0.10µm, 28-32 AWG, Reel	Molex	5011937000	
	J1, J2	Crimp tool Nano Fit	Crimp Tool, Ratchet, Molex Nano-Fit 105300 Series 26- 24AWG Socket Contacts, 207129 Series	Molex	638276000	
	J3, J4, J5, J6	Crimp tool Pico-Clasp	Crimp Tool, Ratchet, Molex Pico-Clasp 501193 & 501334 Series 32-28AWG Contacts	Molex	638191500	

3.7.1 Micro 4803 MZ/PZ-CAN connection diagram



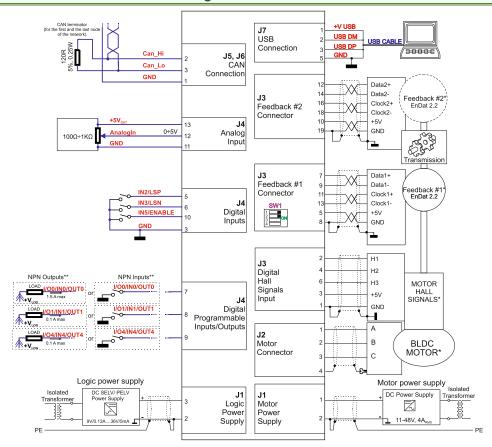
3.7.2 Micro 4803 MZ/PZ-CAT connection diagram



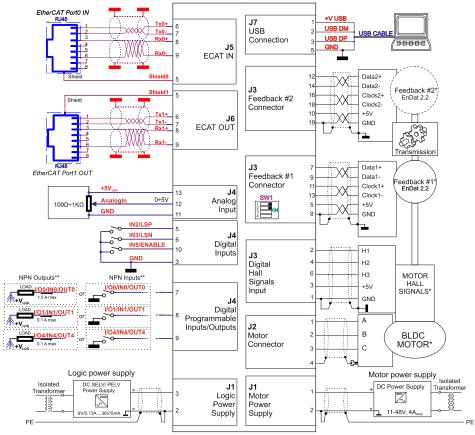
^{*} For other available feedback / motor options, check the detailed diagrams below

^{**} Pins are software selectable individually as NPN inputs/outputs

3.7.3 Micro 4803 CZ-CAN connection diagram



3.7.4 Micro 4803 CZ-CAT connection diagram

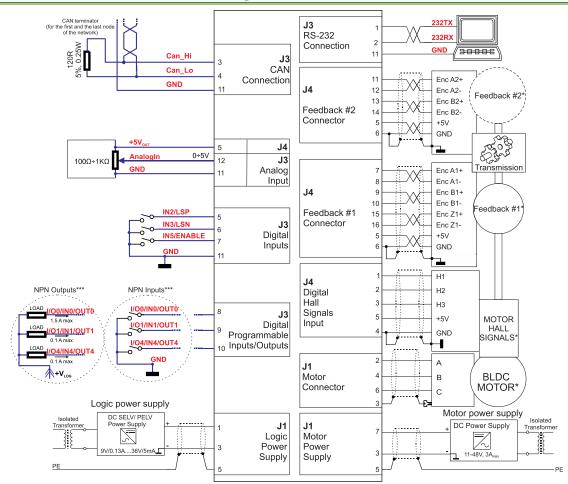


^{*} For other available feedback / motor options, check the detailed connection diagrams below

^{**} Pins are software selectable individually as NPN inputs/outputs

^{***}Magnetics are included on-board

3.7.5 Micro 4803 HZ-CAN connection diagram



 $^{^{\}star}$ For other available feedback / motor options, check the detailed connection diagrams below

^{**} Pins are software selectable individually as NPN inputs/outputs

3.8.1 NPN inputs

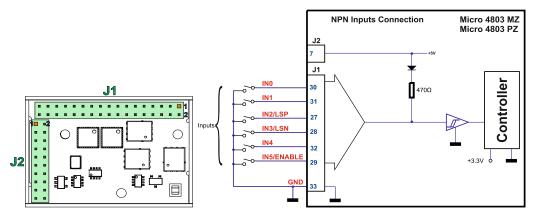


Figure 3-14 Digital NPN Inputs connection for Micro 4803 MZ/PZ

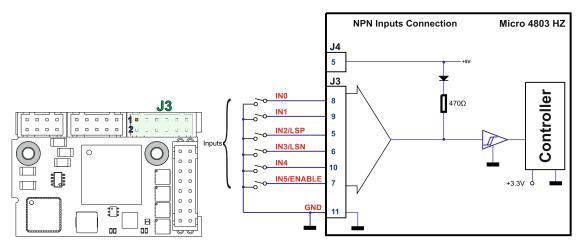


Figure 3-15 Digital NPN Inputs connection for Micro 4803 HZ

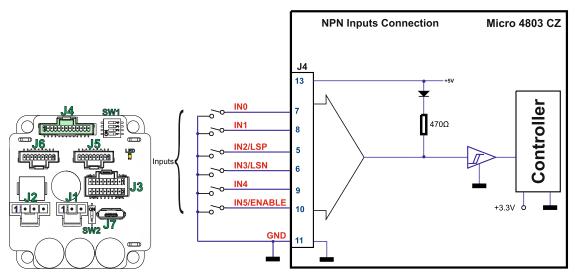


Figure 3-16 Digital NPN Inputs connection for Micro 4803 CZ

Remarks:

- 1. The inputs are compatible with NPN type outputs (input must be pulled to GND to change its default state).
- 2. The I/O pins are software selectable individually as inputs/outputs.
- The length of the cables must be up to 30m, reducing the exposure to voltage surges in industrial environment.

Figure 3-17 Digital NPN Outputs connection for Micro 4803 MZ/PZ

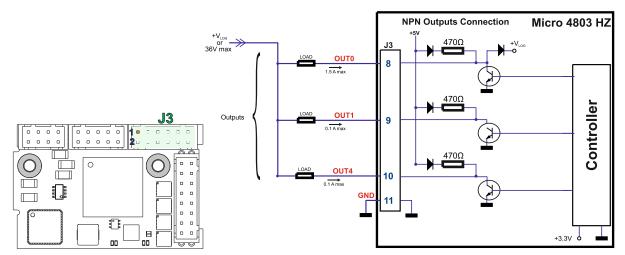


Figure 3-18 Digital NPN Outputs connection for Micro 4803 HZ

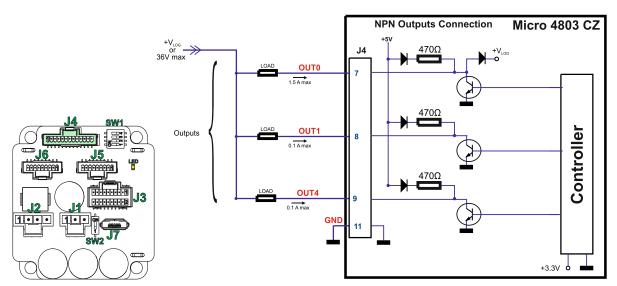


Figure 3-19 Digital NPN Outputs connection for Micro 4803 CZ

Remarks:

- The outputs are compatible with NPN type inputs (load is tied to common +V_{LOG}, output pulls to GND when active and is floating when inactive).
- 2. The I/O pins are software selectable individually as inputs/outputs.

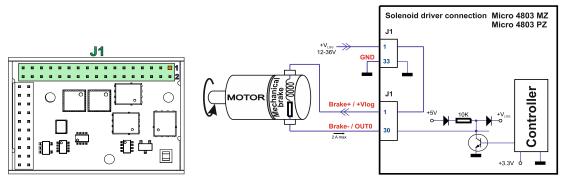


Figure 3-20. Solenoid driver connection for MICRO 4803 MZ/PZ

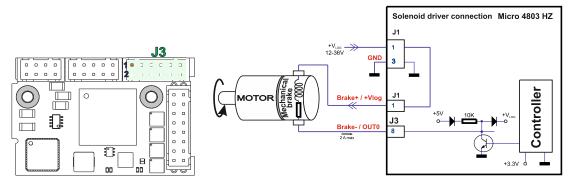


Figure 3-21. Solenoid driver connection for MICRO 4803 HZ

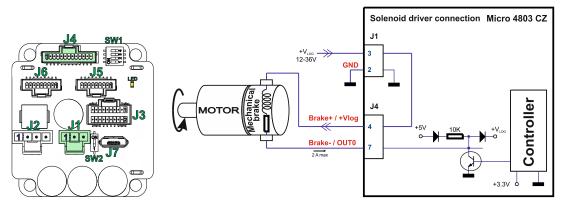


Figure 3-22. Solenoid driver connection for MICRO 4803 CZ

Remarks:

- The firmware can control the Brake- output automatically to engage/disengage a mechanical brake when motor control is started/stopped.
- 2. The Brake- pin can also be used as the NPN digital output OUT0.
- 3. To enable the mechanical brake functionality select the following checkbox from EasyMotion Studio:

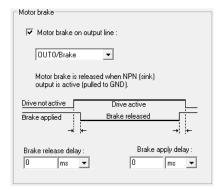


Figure 3-23. Motor brake checkbox in EasyMotion Studio

Figure 3-24 0-5V Analog inputs connection for Micro 4803 MZ and Micro 4803 PZ

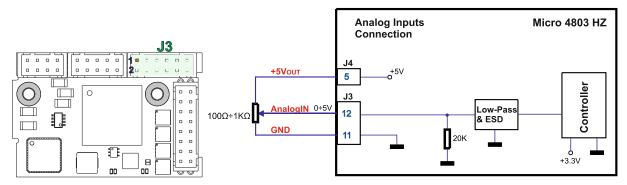


Figure 3-25 0-5V Analog inputs connection for Micro 4803 HZ

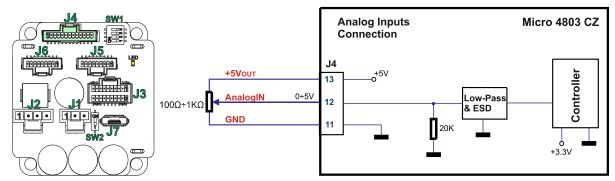


Figure 3-26 0-5V Analog inputs connection for Micro 4803 CZ

Remarks:

- The analog input range is configurable by software: 16bit ±10V or 12-bit 0-5V: Reference, Feedback or general purpose input.
- 2. The length of the cables must be up to 30m, reducing the exposure to voltage surges in industrial environment.

3.9.1.1 Recommendation for wiring

- a) If the analogue signal source is single-ended, use a 2-wire twisted shielded cable as follows: 1st wire connects the live signal to the drive input; 2nd wire connects the source ground to the drive ground; shield will be connected to the drive ground terminal.
- b) If the analogue signal source is differential and the signal source ground is isolated from the drive GND, use a 2-wire twisted shielded cable as follows: 1st wire connects the source plus (positive, in-phase) to the drive analogue input; 2nd wire connects the source minus (negative, out-of-phase) to the drive ground (GND). Shield is connected only at the drive side, to the drive PE, and is left unconnected at the source side.
- c) If the analogue signal source is differential and the signal source ground is common with the drive GND, use a 2-wire shielded cable as follows: 1st wire connects the source plus (positive, in-phase) to the drive analogue input; 2nd wire connects the source ground to the drive ground (GND); shield is connected only at the drive side, to the drive PE, and is left unconnected at the source side. The source minus (negative, out-of-phase) output remains unconnected.

3.10.1 Brushless Motor connection

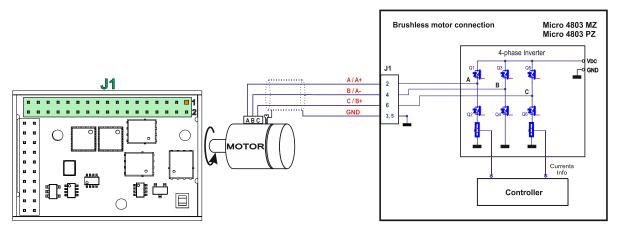


Figure 3-27 Brushless motor connection for Micro 4803 MZ/PZ

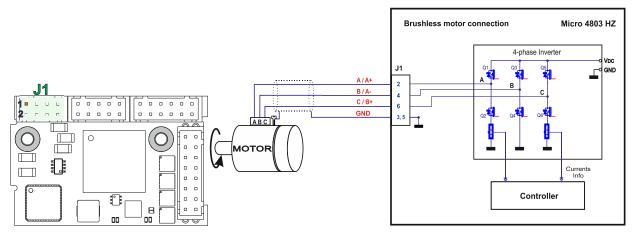


Figure 3-28 Brushless motor connection for Micro 4803 HZ

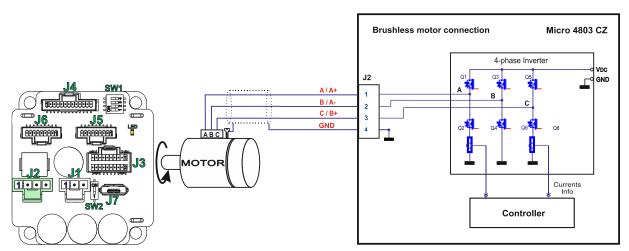


Figure 3-29 Brushless motor connection for Micro 4803 CZ

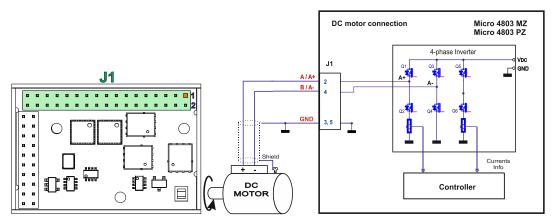


Figure 3-30 DC Motor connection for Micro 4803 MZ/PZ

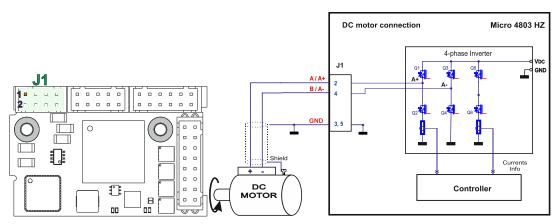


Figure 3-31 DC Motor connection for Micro 4803 HZ

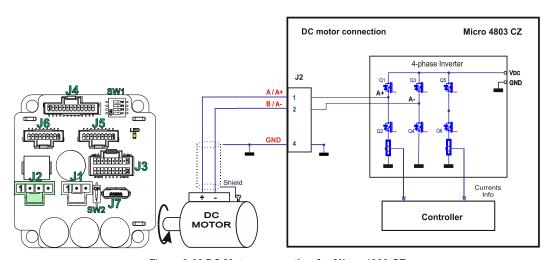


Figure 3-32 DC Motor connection for Micro 4803 CZ

3.10.2.1 Recommendations for motor wiring

- a) Avoid running the motor wires in parallel with other wires for a distance longer than 2 meters. If this situation cannot be avoided, use a shielded cable for the motor wires. Connect the cable shield to the Micro 4803 GND pin and also to the motor chassis.
- b) The parasitic capacitance between the motor wires must not bypass 10nF. If very long cables (tens of meters) are used, this condition may not be met. In this case, add series inductors between the Micro 4803 outputs and the cable. The inductors must be magnetically shielded (toroidal, for example), and must be rated for the motor surge current. Typically the necessary values are around 100 μH.
- c) A good shielding can be obtained if the motor wires are running inside a metallic cable guide.

3.11.1 Feedback #1 - Single-ended Incremental Encoder Connection

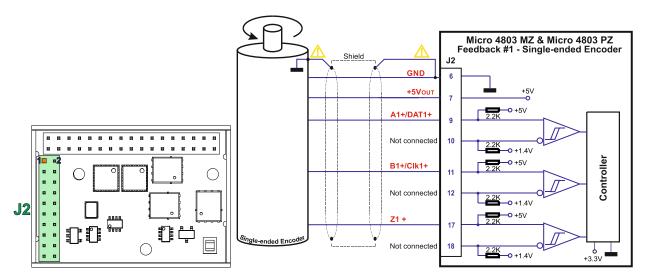


Figure 3-33 Feedback #1 - Single-ended Incremental Encoder Connection for Micro 4803 MZ/PZ



CAUTION!

Do not connect unterminated wires to pins J2.10, J2.12 and J2.18. They might pick up unwanted noise and give false encoder readings. Encoder cable shield must be connected to system GND to avoid disturbances / noise induced by nearby cables.

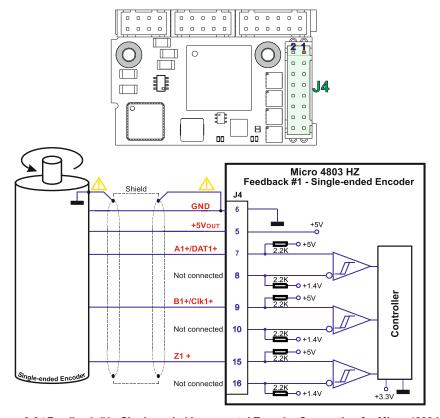


Figure 3-34 Feedback #1 - Single-ended Incremental Encoder Connection for Micro 4803 HZ



CAUTION!

Do not connect unterminated wires to pins J4.8, J4.10 and J4.16. They might pick up unwanted noise and give false encoder readings. Encoder cable shield must be connected to system GND to avoid disturbances / noise induced by nearby cables.

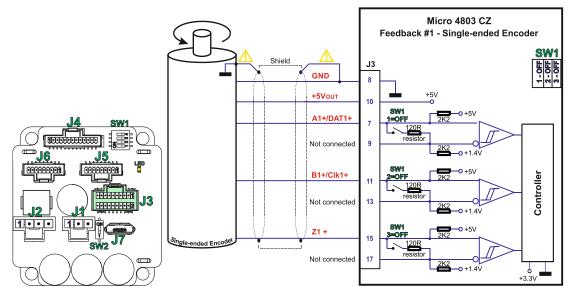


Figure 3-35 Feedback #1 - Single-ended Incremental Encoder Connection for Micro 4803 CZ



CAUTION!

Do not connect unterminated wires to pins J3.9, J3.13 and J3.17. They might pick up unwanted noise and give false encoder readings. Encoder cable shield must be connected to system GND to avoid disturbances / noise induced by nearby cables.

3.11.2 Feedback #1 - Differential Incremental Encoder Connection

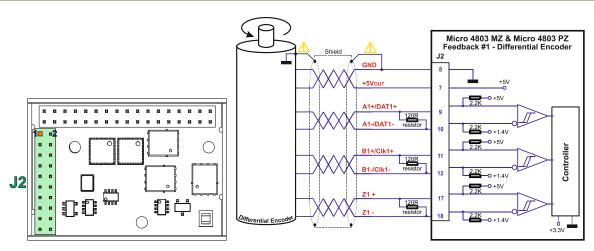


Figure 3-36 Feedback #1 - Differential Incremental Encoder Connection for Micro 4803 MZ/PZ

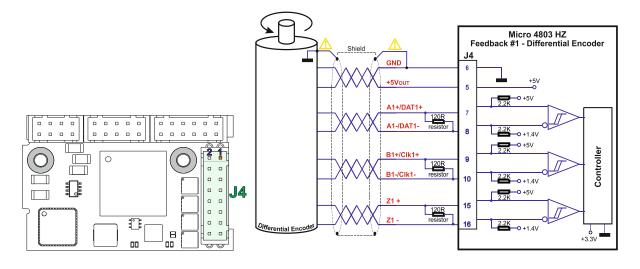


Figure 3-37 Feedback #1 - Differential Incremental Encoder Connection for Micro 4803 HZ

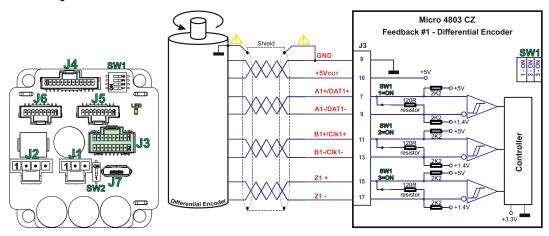


Figure 3-38 Feedback #1 - Differential Incremental Encoder Connection for Micro 4803 CZ

- For Micro 4803 MZ/PZ/HZ Feedback#1 differentia absolute connection, 120Ω (0.25W) terminators must be connected for long encoder cables, or noisy environments.
- For Micro 4803 CZ Feedback #1 differential connection, 120Ω (0.25W) terminators are internally added by putting the SW1 pins 1,2 and 3 on "ON" position.
- The length of the cables must be up to 30m, reducing the exposure to voltage surges in industrial environment.



CAUTION!

Encoder cable shield must be connected to system GND to avoid disturbances / noise induced by nearby cables.

3.11.3 Feedback #2 - Single-ended Incremental Encoder Connection

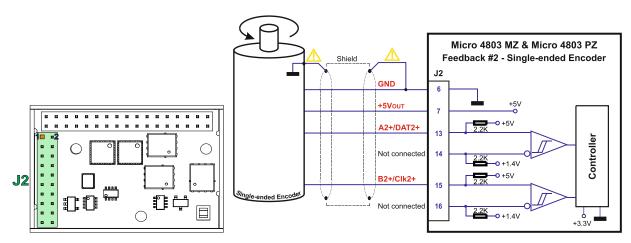


Figure 3-39 Feedback #2 - Single-ended Incremental Encoder Connection for Micro 4803 MZ/PZ



CAUTION!

Do not connect unterminated wires to pins J2.14 and J2.16. They might pick up unwanted noise and give false encoder readings. Encoder cable shield must be connected to system GND to avoid disturbances / noise induced by nearby cables.

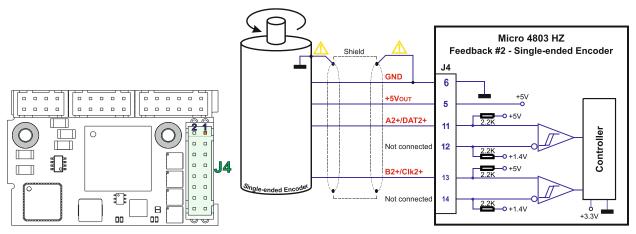


Figure 3-40 Feedback #2 - Single-ended Incremental Encoder Connection for Micro 4803 HZ



CAUTION!

Do not connect unterminated wires to pins J4.12 and J4.14. They might pick up unwanted noise and give false encoder readings. Encoder cable shield must be connected to system GND to avoid disturbances / noise induced by nearby cables.

3.11.4 Feedback #2 - Differential Incremental Encoder Connection

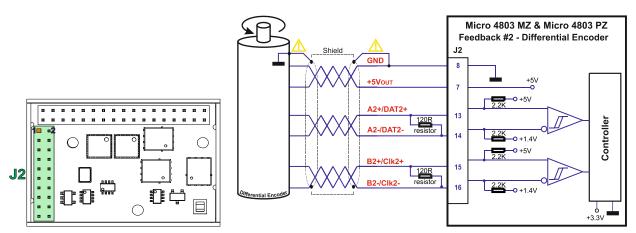


Figure 3-41 Feedback #2 - Differential Incremental Encoder Connection for Micro 4803 MZ/PZ

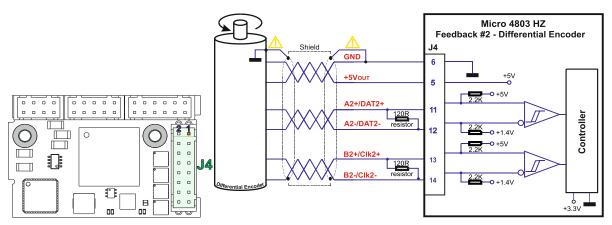


Figure 3-42 Feedback #2 - Differential Incremental Encoder Connection for Micro 4803 HZ

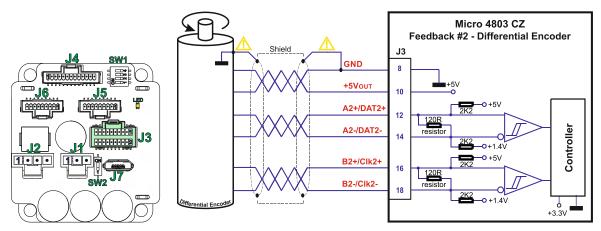


Figure 3-43 Feedback #2 - Differential Incremental Encoder Connection for Micro 4803 CZ

- For Micro 4803 MZ/PZ/HZ Feedback#2 differential absolute connection, 120Ω (0.25W) terminators must be connected for long encoder cables, or noisy environments.
- For Micro 4803 CZ Feedback#2 input has internal terminators, equivalent to 120Ω (0.25W), present in the
 drive
- 3. The length of the cables must be up to 30m, reducing the exposure to voltage surges in industrial environment.



CAUTION! Encoder cable shield must be connected to system GND to avoid disturbances / noise induced by nearby cables.

3.11.5 Feedback #1 - Absolute Encoder Connection: SSI, BiSS, EnDAT

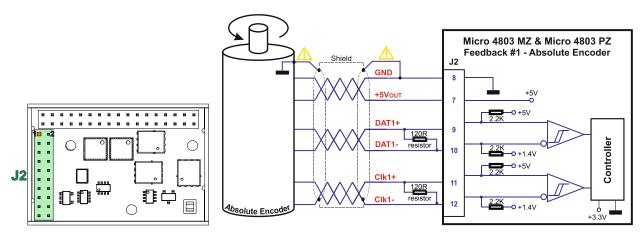


Figure 3-44 Feedback #1 - Absolute Encoder Connection for Micro 4803 MZ/PZ

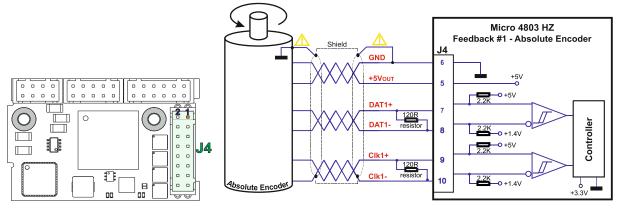


Figure 3-45 Feedback #1 - Absolute Encoder Connection for Micro 4803 HZ

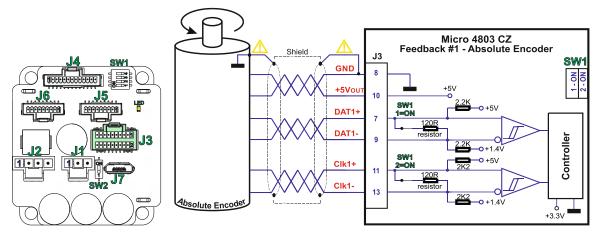


Figure 3-46 Feedback #1 - Absolute Encoder Connection for Micro 4803 CZ

- For Micro 4803 MZ/PZ/HZ Feedback#1 differential absolute connection, 120Ω (0.25W) terminators must be connected for long encoder cables, or noisy environments.
- For Micro 4803 CZ Feedback#1 absolute connection, 120Ω (0.25W) terminators are internally added by putting the SW1 pins 1 and 2 on "ON" position.
- 3. The length of the cables must be up to 30m, reducing the exposure to voltage surges in industrial environment.



CAUTION! Encoder cable shield must be connected to system GND to avoid disturbances / noise induced by nearby cables.

3.11.6 Feedback #1 - Absolute Encoder Connection: Nikon, Tamagawa, Panasonic, Sanyo Denki

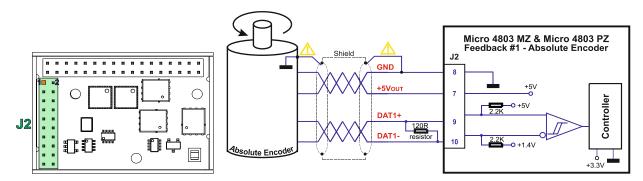


Figure 3-47 Feedback #1 - Absolute Encoder Connection for Micro 4803 MZ/PZ

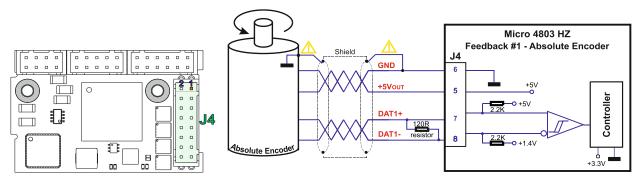


Figure 3-48 Feedback #1 - Absolute Encoder Connection for Micro 4803 HZ

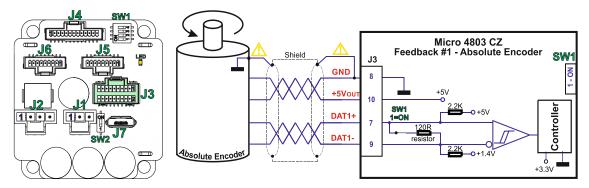


Figure 3-49 Feedback #1 - Absolute Encoder Connection for Micro 4803 CZ

- For Micro 4803 MZ/PZ/HZ Feedback#1 differential absolute connection, 120Ω (0.25W) terminators must be connected for long encoder cables, or noisy environments.
- 2. For Micro 4803 CZ Feedback#1 differential absolute connection, 120Ω (0.25W) terminators are internally added by putting the SW1 pin 1 on "ON" position.
- The length of the cables must be up to 30m, reducing the exposure to voltage surges in industrial environment.



CAUTION!

Encoder cable shield must be connected to system GND to avoid disturbances / noise induced by nearby cables.

3.11.7 Feedback #2 - Absolute Encoder Connection: SSI, BiSS, EnDAT

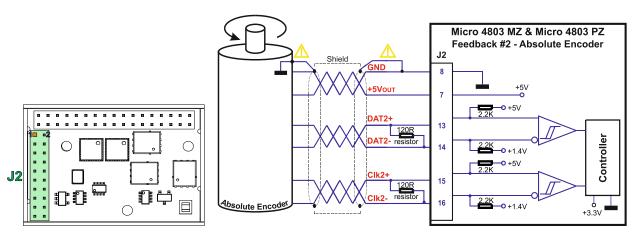


Figure 3-50 Feedback #2 - Absolute Encoder Connection for Micro 4803 MZ/PZ

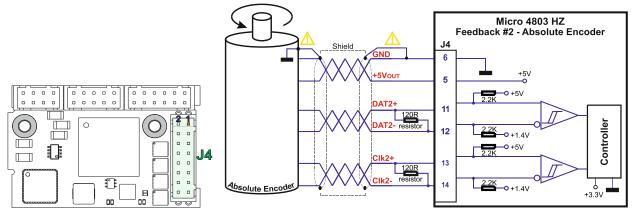


Figure 3-51 Feedback #2 - Absolute Encoder Connection for Micro 4803 HZ

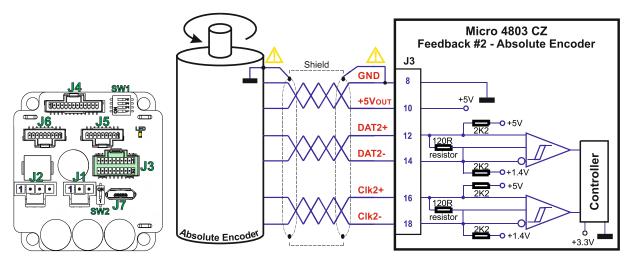


Figure 3-52 Feedback #2 - Absolute Encoder Connection for Micro 4803 CZ

- For Micro 4803 MZ/PZ/HZ Feedback#2 absolute connection, 120Ω (0.25W) terminators must be connected for long encoder cables, or noisy environments.
- For Micro 4803 CZ Feedback #2 input has internal terminators, equivalent to 120Ω (0.25W), present in the drive.
- 3. The length of the cables must be up to 30m, reducing the exposure to voltage surges in industrial environment.



CAUTION!

Encoder cable shield must be connected to system GND to avoid disturbances / noise induced by nearby cables.

3.11.8 Feedback #2 – Absolute Encoder Connection: Nikon, Tamagawa, Panasonic, Sanyo Denki

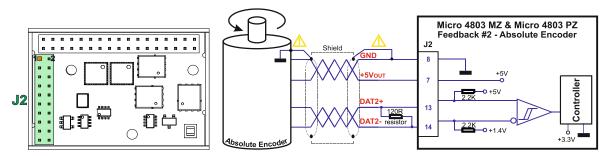


Figure 3-53 Feedback #2 - Absolute Encoder Connection for Micro 4803 MZ/PZ

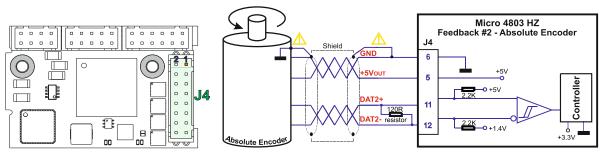


Figure 3-54 Feedback #2 - Absolute Encoder Connection for Micro 4803 HZ

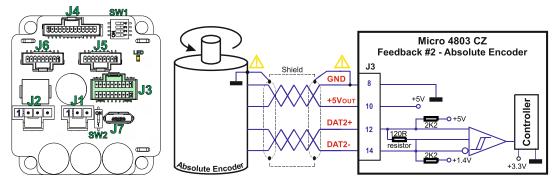


Figure 3-55 Feedback #2 - Absolute Encoder Connection for Micro 4803 CZ

- 1. For Micro 4803 MZ/PZ/HZ Feedback#2 absolute connection, 120Ω (0.25W) terminators must be connected for long encoder cables, or noisy environments.
- 2. For Micro 4803 CZ Feedback #2 input has internal terminators, equivalent to 120Ω (0.25W), present in the drive.
- The length of the cables must be up to 30m, reducing the exposure to voltage surges in industrial environment.



CAUTION! Encoder cable shield must be connected to system GND to avoid disturbances / noise induced by nearby cables.

3.11.9 Linear (Analog) Hall Connection

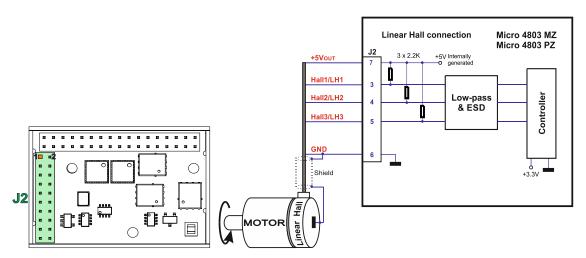


Figure 3-56 Linear Hall connection for Micro 4803 MZ/PZ

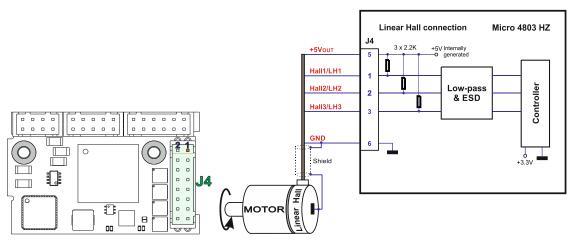


Figure 3-57 Linear Hall connection for Micro 4803 HZ

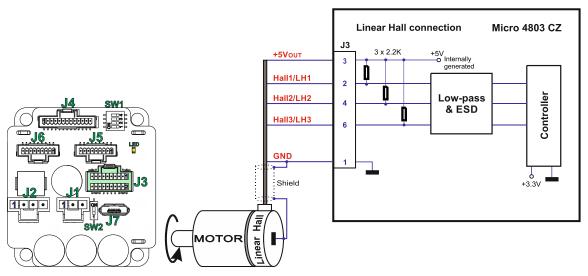


Figure 3-58 Linear Hall connection for Micro 4803 CZ



CAUTION!

Analog Hall cable shield must be connected to system GND to avoid disturbances / noise induced by nearby cables.

3.11.10 Digital Hall Connection for Motor + Hall + Incremental or Absolute Encoder

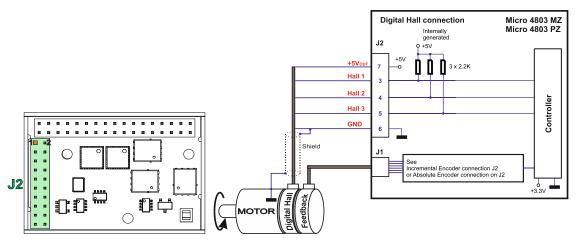


Figure 3-59 Digital Hall connection for Micro 4803 MZ/PZ

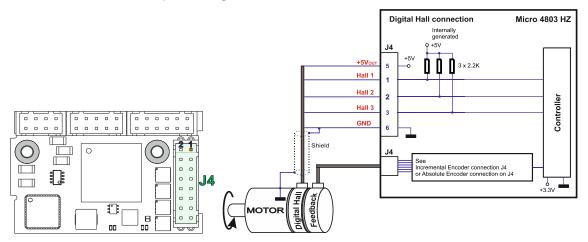


Figure 3-60 Digital Hall connection for Micro 4803 HZ

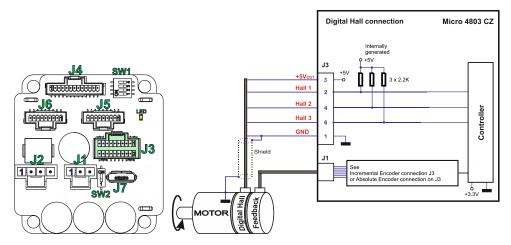


Figure 3-61 Digital Hall connection for Micro 4803 CZ

- This connection is required when using Hall start method BLDC or PMSM and also for the Trapezoidal commutation method. The digital halls are not used in this case as a feedback measurement device. The actual motor control is done with an incremental encoder.
- The Micro 4803 drives are equipped with a feature that detects breakage of Hall wires and/or of incremental/absolute encoder wires.¹
- The length of the cables must be up to 30m, reducing the exposure to voltage surges in industrial environment.



CAUTION!

Digital Hall cable shield must be connected to system GND to avoid disturbances / noise induced by nearby cables.

3.11.11 Digital Hall Connection for Motor + Digital Hall only control

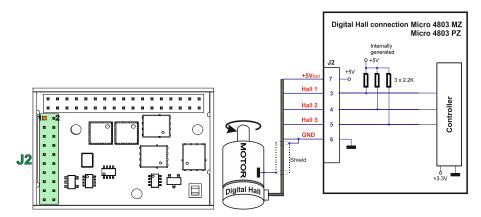


Figure 3-62 Digital Hall connection for Micro 4803 MZ/PZ

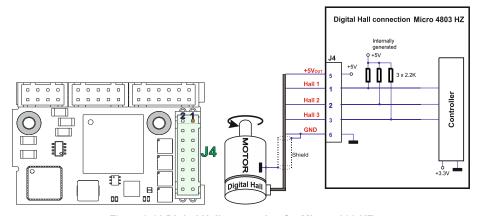


Figure 3-63 Digital Hall connection for Micro 4803 HZ

¹ In case of an absolute encoder connection, if only just one wire is missing from a pair the breakage can't be detected.

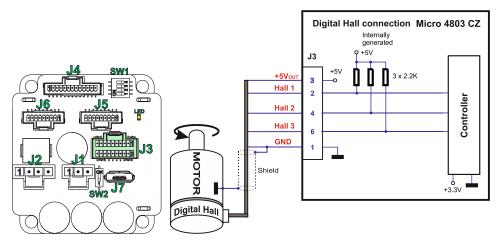


Figure 3-64 Digital Hall connection for Micro 4803 CZ

- This connection is required when using only Digital hall signals as the main feedback device for motor control. In this case, no incremental encoder is needed.
- The length of the cables must be up to 30m, reducing the exposure to voltage surges in industrial environment.
- 3. While using this control scheme, the incremental encoder signals are used internally by the drive.



CAUTION! Digital Hall cable shield must be connected to system GND to avoid disturbances / noise induced by nearby cables.

3.11.11.1 General recommendations for feedback wiring

- a) Always connect both positive and negative signals when the position sensor is differential and provides them. Use one twisted pair for each differential group of signals as follows: A1+/DAT1+ with A1-/DAT1-, B1+/CLK1+ with B1-/CLK1-, Z1+ with Z1-, A2+/DAT2+ with A2-/DAT2- and B2+/CLK2+ with B2-/CLK2-. Use another twisted pair for the 5V supply and GND.
- b) Always use shielded cables to avoid capacitive-coupled noise when using single-ended encoders or Hall sensors with cable lengths over 1 meter. Connect the cable shield to the GND, at both ends.
- c) If the +5V supply output is used by another device (like for example an encoder) and the connection cable is longer than 5 meters, add a decoupling capacitor near the supplied device, between the +5V and GND lines. The capacitor value can be 1...10 μF, rated at 6.3V.

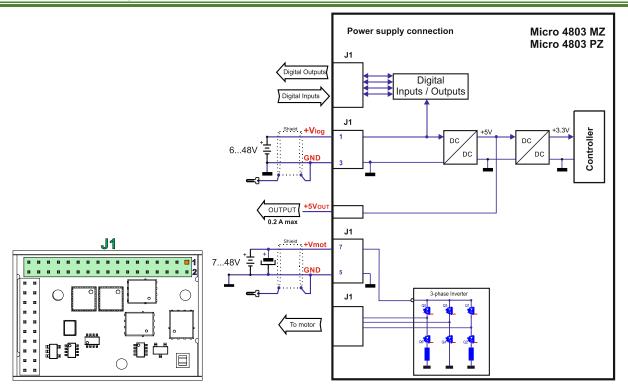


Figure 3-65 Supply connection for Micro 4803 MZ and Micro 4803 PZ

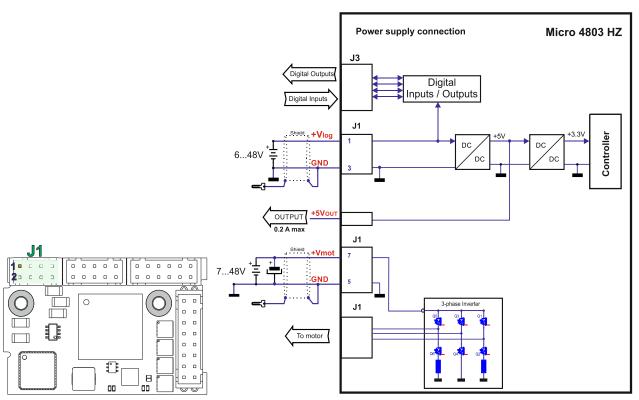


Figure 3-66 Supply connection for Micro 4803 HZ

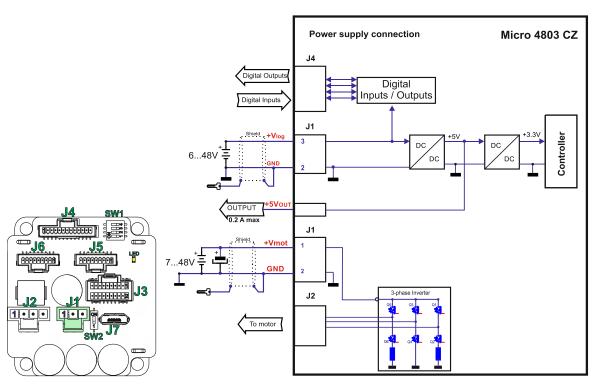


Figure 3-67 Supply connection for Micro 4803 CZ

- 1. The Micro 4803 always requires two supply voltages: $+V_{LOG}$ and $+V_{MOT}$.
- 2. The $+V_{LOG}$ inputs can be supplied from the same power source as long as its output voltage is 6 to 48V DC from a SELV/PELV power supply.
- 3. An external electrolytic capacitor may be added between +V_{MOT} and GND, to help reduce over-voltage during load braking/ reversals. See paragraph 3.10.1.1 for details.

3.12.1.1 Recommendations for Supply Wiring

- a) Use short, thick wires between the Micro 4803 and the motor power supply. Connect power supply wires to all the indicated pins. If the wires are longer than 2 meters, use twisted wires for the supply and ground return. For wires longer than 20 meters, add a capacitor of at least 1000μF (rated at an appropriate voltage) right on the terminals of the Micro 4803.
- b) It is recommended to connect the negative motor supply return (GND) to the Earth protection near the power supply terminals.
- c) The logic and motor power supply cables shield must be connected to GND at both ends.

3.12.1.2 Recommendations to limit over-voltage during braking

During abrupt motion brakes or reversals the regenerative energy is injected into the motor power supply. This may cause an increase of the motor supply voltage (depending on the power supply characteristics). If the voltage bypasses 60V, the drive over-voltage protection is triggered and the drive power stage is disabled.

In order to avoid this situation you need to **add a capacitor on the motor supply** big enough to absorb the overall energy flowing back to the supply. The capacitor must be rated to a voltage equal or bigger than the maximum expected over-voltage and can be sized with the formula:

$$C \ge \frac{2 \times E_M}{U_{MAX}^2 - U_{NOM}^2}$$

where:

 $U_{MAX} = 60V$ is the over-voltage protection limit

U_{NOM} is the nominal motor supply voltage

 E_M = the overall energy flowing back to the supply in Joules. In case of a rotary motor and load, E_M can be computed with the formula:

$$E_{M} = \underbrace{\frac{1}{2}(J_{M} + J_{L})\varpi_{M}^{2} + (m_{M} + m_{L})g(h_{initial} - h_{final}) - 3I_{M}^{2}R_{Ph}t_{d} - \underbrace{\frac{t_{d}\varpi_{M}}{2}T_{F}}_{Copper losses} T_{Friction}$$

where:

J_M – total rotor inertia [kgm²]

J_L – total load inertia as seen at motor shaft after transmission [kgm²]

_{∞M} – motor angular speed before deceleration [rad/s]

m_M - motor mass [kg] - when motor is moving in a non-horizontal plane

 $m_L \;$ – load mass [kg] – when load is moving in a non-horizontal plane

g - gravitational acceleration i.e. 9.8 [m/s²]

hinitial - initial system altitude [m]

hfinal - final system altitude [m]

I_M – motor current during deceleration [A_{RMS}/phase]

 R_{Ph} – motor phase resistance $[\Omega]$

t_d - time to decelerate [s]

T_F – total friction torque as seen at motor shaft [Nm] – includes load and transmission

In case of a linear motor and load, the motor inertia J_M and the load inertia J_L will be replaced by the motor mass and the load mass measured in [kg], the angular speed ϖ_M will become linear speed measured in [m/s] and the friction torque T_F will become friction force measured in [N].

3.13 USB connection

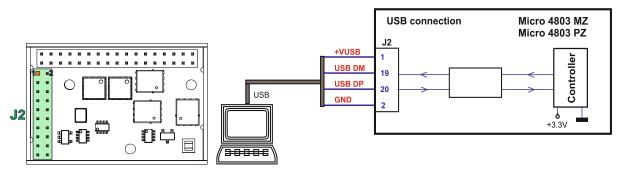


Figure 3-68 USB connection for Micro 4803 MZ/PZ

For Micro 4803 MZ/PZ, high-speed signals (USB DP, USB DM) must be routed as differential pairs, with controlled impedance, microstrip or stripline with 90 ohm differential characteristic impedance.

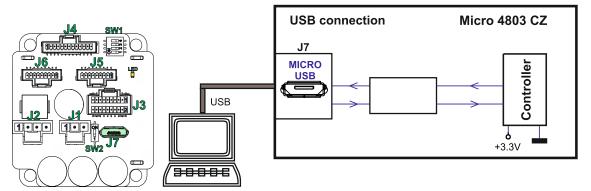


Figure 3-69 USB connection for Micro 4803 CZ

For the USB connection a standard USB cable is required. The drivers are found automatically in Windows 10 and the device is identified as a COM port.

In Easy Motion studio, choose the following communication settings:

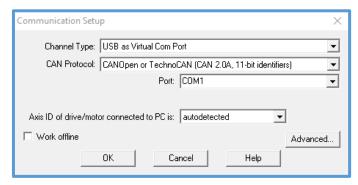


Figure 3-70 USB connection

Instead of COM1, choose the new COM value detected after the driver is installed.

Remark:

- 1. EasyMotion Studio can communicate either with RS232 or USB communication (not both at the same time).
- EasyMotion Studio can communicate in parallel with RS232/USB communication while CAN or EtherCAT communication is active.

3.14 Serial RS-232 connection

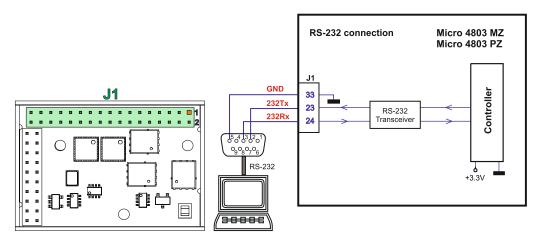


Figure 3-71. Serial RS-232 connection for Micro 4803 MZ/PZ

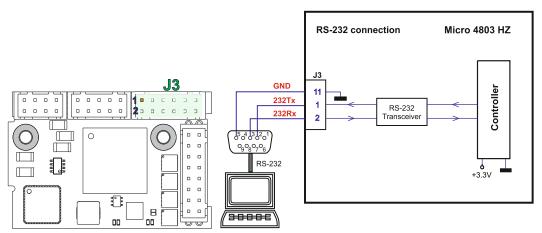


Figure 3-72. Serial RS-232 connection for Micro 4803 HZ

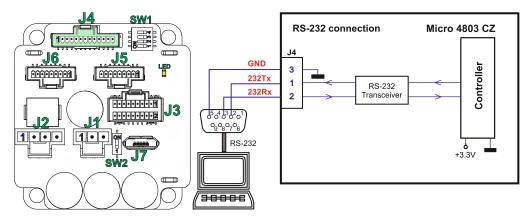


Figure 3-73. Serial RS-232 connection for Micro 4803 CZ

- EasyMotion Studio can communicate either with RS232 or USB communication (not both at the same time).
- EasyMotion Studio can communicate in parallel with serial RS232 communication while CAN or EtherCAT communication is active.

3.14.1.1 Recommendation for wiring

- b) If you build the serial cable, you can use a 3-wire shielded cable with shield connected to BOTH ends. Do not use the shield as GND. The ground wire must be included inside the shield, like the 232Rx and 232Tx signals.
- c) Always power-off all the Micro 4803 supplies before inserting/removing the RS-232 serial connector
- d) Do not rely on an earthed PC to provide the Micro 4803 GND connection! The drive must be earthed through a separate circuit. Most communication problems are caused by the lack of such connection.



CAUTION! DO NOT CONNECT/DISCONNECT THE RS-232 CABLE WHILE THE DRIVE IS PWERED ON. THIS OPERATION CAN DAMAGE THE DRIVE

3.15 CAN-bus connection

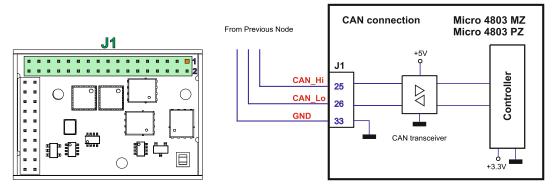


Figure 3-74. CAN connection for Micro 4803 MZ/PZ

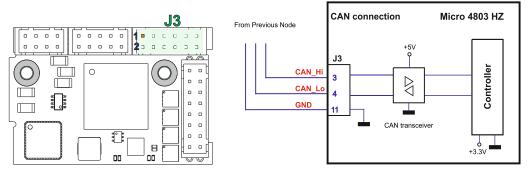


Figure 3-75. CAN connection for Micro 4803 HZ

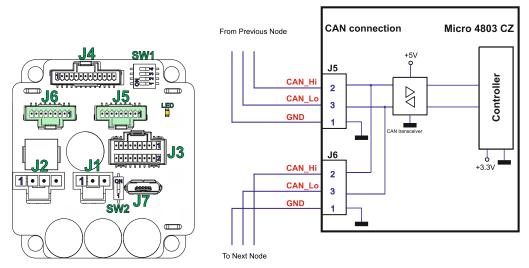


Figure 3-76. CAN connection for Micro 4803 CZ

- 1. The CAN network requires a 120-Ohm terminator. This is not included on any Micro 4803.
- CAN signals are not isolated from other Micro 4803 circuits.
- 3. EasyMotion Studio can communicate in parallel with RS232 communication while CAN communication is active

3.15.1.1 Recommendation for wiring

- Build CAN network using cables with twisted wires (2 wires/pair), with CAN-Hi twisted together with CAN-Lo. It is recommended but not mandatory to use a shielded cable. If so, connect the shield to GND. The cable impedance must be 105 ... 135 ohms (120 ohms typical) and a capacitance below 30pF/meter.
- b) When using a printed circuit board (PCB) motherboard based on FR-4 material, build the CAN network using a pair of 12mil (0.012") tracks, spaced 8 to 10mils (0.008"...0.010") apart, placed over a local ground plane (microstrip) which extends at least 1mm left and right to the tracks.
- c) Whenever possible, use daisy-chain links between the CAN nodes. Avoid using stubs. A stub is a "T" connection, where a derivation is taken from the main bus. When stubs can't be avoided keep them as short as possible. For 1 Mbit/s (worst case), the maximum stub length must be below 0.3 meters.
- d) The 120Ω termination resistors must be rated at 0.2W minimum. Do not use winded resistors, which are inductive.

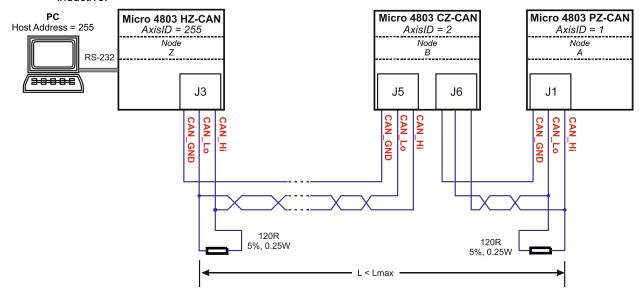


Figure 3-77. Multiple-Axis CAN network

3.16.1 Recommendations for EtherCAT Wiring

- Build EtherCAT® network using UTP (unshielded twisted pair) cables rated CAT5E or higher (CAT6, etc.).
 Cables with this rating must have multiple characteristics, as described in TIA/EIA-568-B. Among these are: impedance, frequency attenuation, cross-talk, return loss, etc.
- It is acceptable to use STP (shielded twisted pair) or FTP (foil twisted pair) cables, rated CAT5E or higher (CAT6, etc.). The added shielding is beneficial in reducing the RF (radio-frequency) emissions, improving the EMC emissions of the application.
- The maximum length of each network segment must be less than 100 meters.
- The network topology is daisy-chain. All connections are done using point-to-point cables. The global topology can be one of the two:
 - Linear, when the OUT port of the last drive in the chain remains not connected. Master is connected to IN port of the first drive; OUT of the first drive is connected to IN of the following drive; OUT of the last drive remains unconnected. See *Figure 3-78* for a visual representation of the linear topology.
 - Ring, when the OUT port of the last drive in the chain is connected back to the master controller, on the 2nd port of the master. This topology consists of the linear topology described above, plus an extra connection between the master, which has two RJ45 ports, to OUT of the last drive. See Figure 3-79 for a visual representation of the ring topology.
- Ring topology is preferred for its added security, since it is insensitive to one broken cable / connection along the ring (re-routing of communication is done automatically, so that to avoid the broken cable / connection)
- It is highly recommended to use qualified cables, assembled by a specialized manufacturer. When using CAT5E UTP cables that are manufactured / commissioned / prepared on-site, it is highly recommended to check the cables. The check should be performed using a dedicated Ethernet cable tester, which verifies more parameters than simple galvanic continuity (such as cross-talk, attenuation, etc.). The activation of "Link" indicators will NOT guarantee a stable and reliable connection! This can only be guaranteed by proper quality of cables used, according to TIA/EIA-568-B specifications.
- If desired, Micro 4803 CZ-specific EtherCAT IN (J5) and EtherCAT OUT (J6) ports can be converted to a standard RJ45 connector as shown in *Figure 3-80*.

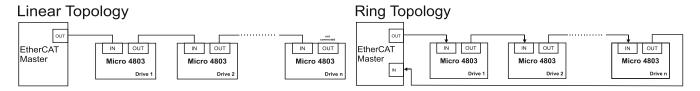


Figure 3-78 EtherCAT network linear topology

Figure 3-79 EtherCAT network ring topology

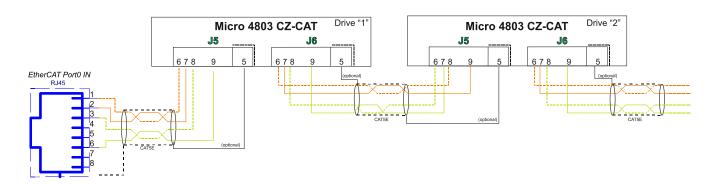


Figure 3-80 EtherCAT wiring for Micro 4803 CZ

Remark: EasyMotion Studio can communicate in parallel with RS232 or USB communication while EtherCAT communication is active

3.16.2 EtherCAT signals schematic considerations

- Ports cannot be swapped. Port IN (0) must be always used for connection, while port OUT (1) can be
 optionally left disconnected (inactive). Swapping ports can lead to packet loss, see EtherCAT documentation
 on circulating packets.
- For both ports, transmit and receive paths can be swapped freely. For example, it is possible to swap the group (Tx0+, Tx0-) with the group (Rx0+, Rx0-). This feature, called "Auto MDI/MDI-X", is present on all EtherCAT devices. As a consequence, it is possible to connect EtherCAT devices either by patch cables (1:1 wiring), or by cross-over cables (pair 1-2 swapped with 3-6).
- This feature is already used in the proposed schematics, where channels of Port 0 (IN) have different allocation than channels of Port 1 (OUT).
- For all 4 differential channels, positive and negative lines can be swapped freely. For example, it is possible to swap Tx0+ with Tx0-. This feature, which is specific to Micro 4803 and not to all EtherCAT devices, makes wiring errors transparent, without any hidden consequence. This feature is already used in the proposed schematics, where both channels of Port 0 (IN) have different polarity than both channels of Port 1 (OUT).

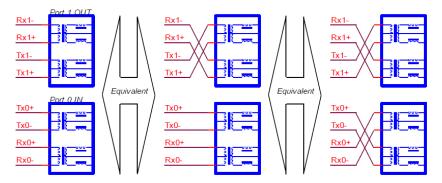


Figure 3-81 Auto MDI/MDI-X

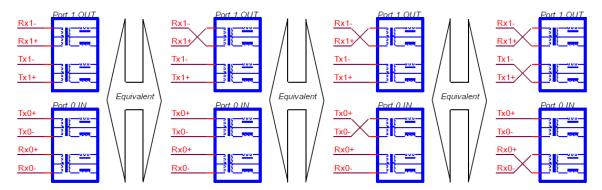


Figure 3-82 Auto Polarity Detection and Correction

3.17 Disabling Autorun (for CAN drives); Disabling the setup table (for CAT drives)

3.17.1 Disabling Autorun (for CAN drives)

When an Micro 4803 CAN is set in TMLCAN operation mode, by default after power-on it enters automatically in Autorun mode. In this mode, if the drive has in its local EEPROM a valid TML application (motion program), this is automatically executed as soon as the motor supply V_{MOT} is turned on.

In order to disable Autorun mode, there are 3 methods:

- a) Software by writing value 0x0001 in first EEPROM location at address 0x2000
- b) Hardware1 set the drive temporarily in CANopen mode. While in CANopen state, no motion will autorun.
- c) Hardware2 by temporary connecting all digital Hall inputs to GND, during the power-on for about 1 second, until the green LED is turned on, as shown in Figure 3-83, Figure 3-84 and Figure 3-85. This option is particularly useful when it is not possible to communicate with the drive.

After the drive is set in non-Autorun/slave mode using 2nd method, the 1st method may be used to invalidate the TML application from the EEPROM. On next power on, in absence of a valid TML application, the drive enters in the non-Autorun/slave mode independently of the digital Hall inputs status.

3.17.2 Disabling the setup table at startup (for CAT drives)

In some very rare cases, the setup table might be corrupted, causing the drive to reset continuously. This state can be noticed by seeing both the Ready and Error LED blinking for short periods of time continuously.

To recover from this state, the setup table must be invalidated by connecting all digital Hall inputs to GND.

On the next power on, the drive will load the default settings and set bit 2 from Motion Error Register – "Invalid Setup Data". After a new valid setup table is loaded onto the drive, disconnect the hall sensors from GND and execute a new power off/ power on cycle.

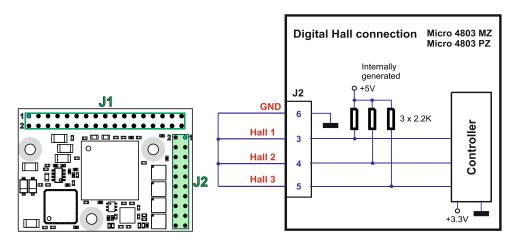


Figure 3-83 Temporary connection during power-on to invalidate the Setup table for Micro 4803 MZ/PZ

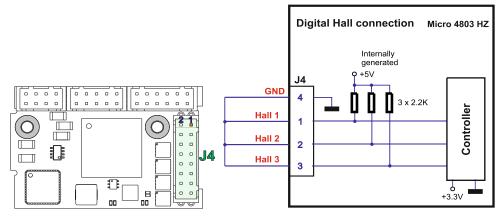


Figure 3-84 Temporary connection during power-on to invalidate the Setup table for Micro 4803 HZ

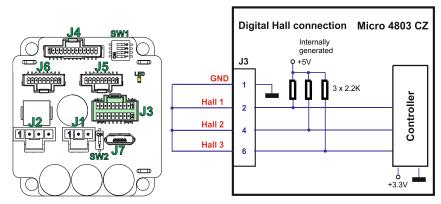


Figure 3-85 Temporary connection during power-on to invalidate the Setup table for Micro 4803 CZ

3.18 LED Indicators

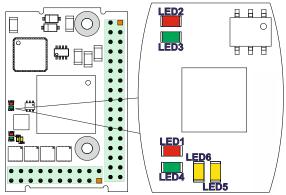


Figure 3-86 LED indicators for Micro 4803 MZ

Table 1- LED indicators description for Micro 4803 MZ/PZ

No.	Name	Color	Description	
LED1	ECAT ERR	RED	EtherCAT® ERROR indicator.	
LED2	TML ERR	RED	Turned on when the drive detects an error condition.	
LED3	TML RDY	GREEN	Lit after power-on when the drive initialization ends. Turned off when an error occurs.	
LED4	ECAT RUN	GREEN	EtherCAT® RUN indicator.	
LED5	ECAT ACT0	YELLO W	Shows the state of the physical link and	
LED6	ECAT ACT1	YELLO W	activity for ECAT IN and OUT ports.	
LED1, L CAN.	LED1, LED4, LED5 and LED6 are reserved for Micro 4803 MZ/PZ-CAN.			

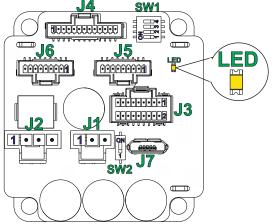


Figure 3-87 LED indicators for Micro 4803 CZ

Table 2- LED indicators description for Micro 4803 CZ

No	ο.	Color	Description
LE	D1	YEIIOW	The LED (yellow) shows the status of the drive that its logic is supplied.

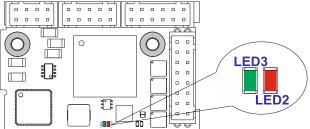


Figure 3-88 LED indicators for Micro 4803 HZ

Table 3- LED indicators description for Micro 4803 HZ

No.	Name	Color	Description					
LED2	TML ERR		Turned on when the drive detects an error condition.					
LED3	TML RDY	GREEN	Lit after power-on when the drive initialization ends. Turned off when an error occurs.					

The RUN states are displayed with a 180 degree phase shift to the ERROR states as noted in Figure 3-89. STATUS indicator Example.

The behavior of the RUN indicator is specified in Table 4. RUN Indicator States" and the behavior of the ERROR indicator specified in Table 5. ERROR Indicator States".

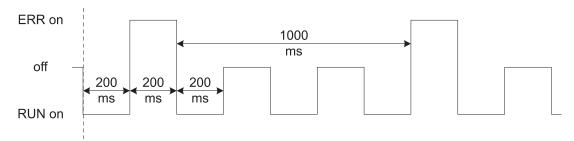


Figure 3-89. STATUS indicator Example

Table 4. RUN Indicator States

Table 11 (C) This outer Clare					
Indicator states	Slave State	Description			
Off	INITIALISATION	The drive is in state INIT			
Blinking	PRE-OPERATIONAL	The drive is in state PRE-OEPRATIONAL			
Single Flash	SAFE-OPERATIONAL	The drive is in state SAFE-OPERATIONAL			
On	OPERATIONAL	The drive is in state OPERATIONAL			

Table 5. ERROR Indicator States

ERR state	Error name	Description
On	Application controller failure	An critical communication or application controller error has occurred
Double Flash	Process Data Watchdog Timeout/ EtherCAT Watchdog Timeout	An application watchdog timeout has occurred.
Single Flash	Local Error	Slave device application has changed the EtherCAT state autonomously, due to local error (see ETG.1000 part 6 EtherCAT State Machine). Error Indicator bit is set to 1 in AL Status register.
Blinking	Invalid Configuration	General Configuration Error
Flickering	Booting Error	Booting Error was detected. INIT state reached, but Error Indicator bit is set to 1 in AL Status register
Off	No error	The EtherCAT communication of the device is in working condition

For a more detailed description of EtherCAT® LED functionalities please read ETG.1300 S (R) V1.0.1 available at www.EtherCAT.org

3.19 Axis ID Selection and Operation Mode

3.19.1 Axis ID Selection for Micro 4803 MZ/PZ-CAT

The **Micro 4803 MZ/PZ-CAT** drive support all EtherCAT standard addressing modes. In case of device addressing mode based on node address, the drive sets the *configured station alias* address with its AxisID value. The drive **AxisID value** is set after power on by:

- Software, setting via EasySetUp and EasyMotion Studio a specific AxisID value in the range 1-255.
- **Hardware**, by setting h/w in Easy setup under Axis ID value and selecting a value between 1-255 from the J1 pins 10, 21 and 22.

The AxisID is set by providing a voltage to the AxisID pins (ID0, ID1 and ID2) according to Table 6- AxisID Register.

MSB	Axis	ID registe	er	LSB
Bit 8 Bit	7 Bit 6 Bit	Bit 4 Bit 3	Bit 2 Bit	1 Bit 0
ID2		ID1	IDO	
Nominal[V]	Minimum[V]	Maximum[V]	IDx* Bits	IDx* Value
0.000	0.00	0.53	000	0
1.057	0.53	1.41	001	1
1.756	1.41	2.01	010	2
2.254	2.01	2.43	011	3
2.600	2.43	2.75	100	4
2.894	2.75	3.01	101	5
3.128	3.01	3.22	110	6
3.319	3.22	3.35	111	7
Α.	-:-ID - C4*/ID2 \/-		\ . (ID0 \/ala)	

AxisID = 64*(ID2 Value) + 8*(ID1 Value) + (ID0 Value)

Remarks:

- 1. The drive axis / address number is set when H/W is selected in Drive Setup under AxisID field or when the Setup is invalid.
- 2. If the AxisID pins are not connected (floating) the AxisID value can't be determined.
- 3. If all "IDx" pins are connected to GND, the AxisID value is 255 and the EtherCAT register called "configured station alias" will be 0
- 4. If Bit 8=1 the AxisID is set to 255 and the EtherCAT register called "configured station alias" will be 0.
- 5. All pins are sampled at power-up, and the drive is configured accordingly.

3.19.2 Axis ID Selection and Operation Mode for Micro 4803 MZ/PZ-CAN

The drive AxisID value is set after power on by:

- Software, setting via EasySetUp or EasyMotionStudio a specific AxisID value in the range 1-255.
- Hardware, by setting "H/W" option in Drive Setup dialogue from EasySetUp or EasyMotionStudio and set the "IDx" pins according to *Table 7-* **AxisID Register for Micro 4803 MZ/PZ-CAN**

Table 7- AxisID Register for Micro 4803 MZ/PZ-CAN

MSB	Axis	ID registe	er	LSB
Bit 8 Bit 7	Bit 6 Bit	5 Bit 4 Bit 3	Bit 2 Bit	1 Bit 0
ID2		ID1	ID	0
Nominal[V]	Minimum[V]	Maximum[V]	IDx* Bits	IDx* Value
0.000	0.00	0.53	000	0
1.057	0.53	1.41	001	1
1.756	1.41	2.01	010	2
2.254	2.01	2.43	011	3
2.600	2.43	2.75	100	4
2.894	2.75	3.01	101	5
3.128	3.01	3.22	110	6
3.319	3.22	3.35	111	7
TMLCAN mode: Ax	$isID = (64*ID2_Value)$	alue - 128) + (8*ID1	_Value) + ID0_V	alue

CANopen mode: AxisID = (64*ID2_Value) + (8*ID1_Value) + ID0_Value

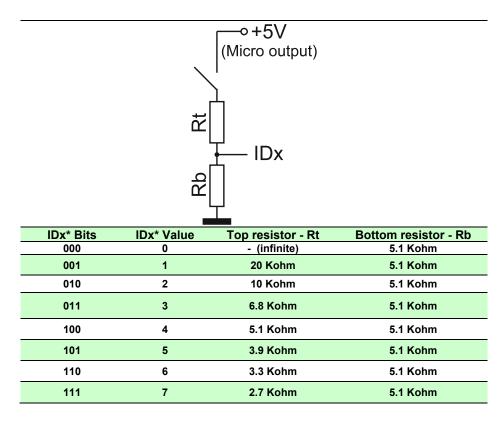
*where "x" can be 1, 2 or 3

^{*}where "x" can be 1, 2 or 3

- 1. If Bit 7 (ID2) = 1 -> TMLCAN mode is selected.
- 2. If Bit 7 (ID2) = 0 -> CANopen mode is selected.
- 3. Bit 8 (MSB of ID2) is ignored, and always considered as "0".
- 4. The maximum AxisID value is 127 (Bit 0 ... Bit 6).
- 5. If the AxisID pins are not connected, the AxisID value can't be determined.
- 6. If all "IDx" pins are connected to GND the AxisID value is 255.
- 7. If the CANOpen mode is selected and the AxisID value is 255, drive will be in "LSS inactive" state and the Green LED will flash at 1 second intervals.

3.19.3 Hardware Axis ID implementation for Micro 4803 MZ/PZ

To obtain the voltages and thus the corresponding values for the AxisID pins - 'IDx,' the following connection scheme and resistor values can be used:



In order to link the AxisID pins to a DIP switch for accessing all the available Axis ID values, the following connection and resistor values can be used:

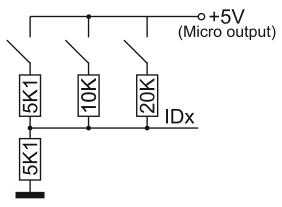


Figure 3-90. How to connect the AxisID pins to a DIP switch

^{*} where "x" can be 1, 2 or 3

To connect the AxisID pins to a HEX switch for accessing all the available Axis ID values, you can utilize the following connection setup and resistor values:

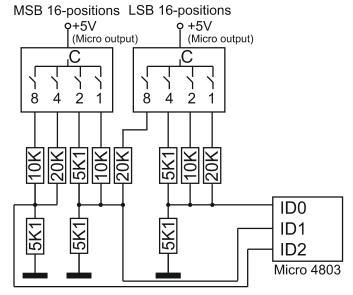


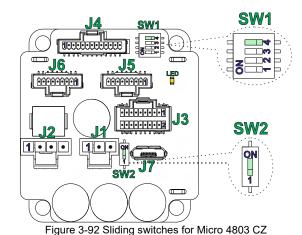
Figure 3-91. How to connect the AxisID pins to a HEX switch

Remark: It is recommended to employ resistors with a tolerance of +/-5% or higher for all the connections.

3.19.4 Axis ID Selection for Micro 4803 CZ-CAT

The Micro 4803 CZ-CAT drives support all EtherCAT standard addressing modes. In case of device addressing mode based on node address, the Micro 4803 drives sets the EtherCAT register called "configured station alias address" with its AxisID value. The AxisID can be changed to a value between 1 and 255 using EasySetUp or EasyMotion Studio from the "Drive Setup" dialogue.

The AxisID on Micro 4803 CZ can be set also by hardware, when setting "H/W" option in Drive Setup dialogue from EasySetUp or EasyMotionStudio and setting the SW1 & SW2 switches according to *Table 8* Axis ID switch settings for Micro 4803 CZ-CAT.



SW1 – Position 4	SW2	AxisID
OFF	OFF	255, the EtherCAT register called "configured station alias" will be 0
OFF	ON	1
ON	OFF	128
ON	ON	129

Table 8 Axis ID switch settings for Micro 4803 CZ-CAT

Remarks:

- 1. The drive axis/address number is set when H/W is selected in Drive Setup under AxisID field or when the Setup is invalid.
- 2. When Axis ID is 255, the EtherCAT register called "configured station alias" will be 0.
- 3. All pins are sampled at power-up, and the drive is configured accordingly.

The drive AxisID value is set after power on by:

- Software, setting via EasySetUp or EasyMotion Studio a specific AxisID value in the range 1-255.
- Hardware, by setting "H/W" option in Drive Setup dialogue from EasySetUp or EasyMotionStudio and setting
 the SW1 switch according to Table 9 Axis ID switch settings for Micro 4803 CZ-CAN

SW1 - Position 4	AxisID Value
OFF	AxisID value = 255. If CANOpen mode is selected and AxisID value is 255, the drive will be in "LSS inactive" state.
ON	AxisID value = 1.

Table 9 Axis ID switch settings for Micro 4803 CZ-CAN

The communication protocol can be set by the **SW2** switch:

- ON = TMLCAN mode is selected;
- OFF = CANopen mode is selected

4 Electrical Specifications

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

- V_{LOG} = 24 VDC; V_{MOT} = 48VDC; F_{PWM} = 20 kHZ
- Supplies start-up / shutdown sequence: -any-
- Load current (sinusoidal amplitude) for Micro 4803 MZ/HZ = 4.2A
- Load current (sinusoidal amplitude) for Micro 4803 PZ/CZ = 5.6A

4.1 Operating Conditions

		Min.	Тур.	Max.	Units
Ambient temperature ¹		0		+40	°C
Ambient humidity	Non-condensing	0		90	%R h
Altitude / procesure?	Altitude (referenced to sea level)	-0.1	0 ÷ 2.5	2	Km
Altitude / pressure ²	Ambient Pressure	0 2	0.75 ÷ 1	10.0	atm

4.2 Storage Conditions

		Min.	Тур.	Max.	Units
Ambient temperature		-40		100	°C
Ambient humidity	Non-condensing	0		100	%R h
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

4.3 Mechanical Mounting

		Min.	Тур.	Max.	Units		
Airflow			natural convection 3, closed box				
	Between adjacent drives		10		mm		
Spacing required for horizontal mounting.	Between drives and nearby walls		10		mm		
Spacing required for nonzonial mounting.	Space needed for drive removal		20		mm		
	Between drives and roof-top		30		mm		
Insertion force	Halian and the state of the sta		20		Ν		
Extraction force	Using recommended mating connectors		8		N		

4

Operating temperature at higher temperatures is possible with reduced current and power ratings

² Micro 4803 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.

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

4.4 Environmental Characteristics

			Min.	Тур.	Max.	Units
		Micro 4803 MZ	3	38.1 x 25 x 9.5		
		MICIO 4603 MZ	~1	~1.5 x 0.98 x 0.37		
		Micro 4803 PZ	38	.3 x 26.8 x	(11.3	mm
Size	Global size	WICTO 4603 PZ	~1	.5 x 1.05 x	0.44	inch
(Length x Width x Height)	(Without connectors)	Miere 4902 LIZ	38	.35 x 25 x	9.71	mm
		Micro 4803 HZ Micro 4803 CZ	~1.	51 x 0.98	x 0.38	inch
			40	40.6 x 38.6 x 22.8		
		WIC10 4603 CZ	~	~1.6 x 1.52 x 0.9		
	Micro 4	1803 MZ		8		
Moight	Micro 4	4803 PZ		-		_
Weight	Micro 4	1803 HZ		8		g
	Micro 4	1803 CZ		22.3		
Cleaning agents	Dry cleaning is recommended		Only	Water- or	Alcohol- I	pased
Protection degree	According to IEC60529, UL50	8		IP20		-
Dissipated naver	Idle	1.5			W	
Cleaning agents Protection degree Dissipated power	Operating			2.8		_ vv
Global Efficiency				98		%

4.5 Logic Supply Input (+V_{LOG})

		Min.	Тур.	Max.	Units
Supply voltage	Nominal values	6	24	48	V_{DC}
	Absolute maximum values, drive operating but outside guaranteed parameters	4.9		60	V_{DC}
	Absolute maximum values, continuous			63	V_{DC}
1	+V _{LOG} = 12V		90	150	
	$+V_{LOG} = 24V$		60	90	mA
	$+V_{LOG} = 48V$		45	60	
Voltage Measurement	Total Error			1.5	%
Utilization Category	Acc. to 60947-4-1 (I _{PEAK} <=1.05*I _{NOM})	DC-1			

4.6 Motor Supply Input (+VMOT)

		Min.	Тур.	Max.	Units
	Nominal values	7		48	V_{DC}
Supply voltage	Absolute maximum values, drive operating but outside guaranteed parameters	6		60	V _{DC}
	Absolute maximum values, continuous	-0.5		63	V_{DC}
	Idle		25		mA
Supply current	Operating	-15	±3	+15	
117	Absolute maximum value, short-circuit condition (Duration ≤ 10ms) [†]			16.5	Α
Voltage Measurement	Total Error			1.5	%
Utilization Category	Acc. to 60947-4-1 (I _{PEAK} <=4.0*I _{NOM})	DC-3			

4.7 .RS-232

		Min.	Тур.	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

4.8 USB

		Min.	Тур.	Max.	Units
Compliance	USB 2.0 device (slave))			
End-point type	Emulated		UART (RS-232)		
ESD protection	Human body model	±1			kV

Motor Outputs (A/A+, B/A-, C)

				Min.	Тур.	Max.	Units	
		Micro 4803 M	IZ			4.2		
	DMCM meters sinussidal amplitude	Micro 4803 P	Z			5.6		
Peak current Peak current Short-circuit protection Short-circuit protection On-state voltage drop Voltage efficiency Off-state leakage curre Motor inductance (phase-to-phase) Motor electrical time-	PMSM motors sinusoidal amplitude	Micro 4803 H	Z			4.2	Α	
		Micro 4803 C	Z			5.6		
		Micro 4803 MZ				3		
Nominal current	PMSM motors sinusoidal RMS	Micro 4803 P	Z^1			4		
	FINOM MOIOIS SINUSOIDAI RINO	Micro 4803 H	Z			3	A _{RMS}	
		Micro 4803 CZ				4		
		Micro 4803 M	IZ^2			3.65		
	DC/BLDC motors continuous	Micro 4803 P	Z^1			4.85	Α	
	DC/BEDC IIIotors continuous	Micro 4803 H	Z			3.65	_ ^	
			Z			4.85		
Peak current	maximum 2.5s			-14		+14	Α	
Short-circuit protectio	n threshold			±16.5		±18	Α	
Short-circuit protectio	n delay			2		4	μS	
9	Nominal output current; including ty resistance	pical mating co	onnector contact		0.1		V	
Voltage efficiency					92		%	
Off-state leakage curi	rent				0.3	1	mA	
			F _{PWM} = 20 kHz		900			
		. 50/	F _{PWM} = 40 kHz		480		1	
	Recommended value, for ripple	e ±5% of	$F_{PWM} = 60 \text{ kHz}$		320		μН	
	measurement range; $+V_{MOT} = 48 \text{ V}$		$F_{PWM} = 80 \text{ kHz}$		240			
Motor inductance			$F_{PWM} = 100 \text{ kHz}$		200			
(phase-to-phase)			F _{PWM} = 20 kHz		270			
	Alexander material construction of the standard land		F _{PWM} = 40 kHz		150			
	Absolute minimum value, limited by protection; $+V_{MOT} = 48 \text{ V}$	short-circuit	F _{PWM} = 60 kHz		100		μН	
	protection, +v _{MOT} = 46 v		F _{PWM} = 80 kHz		80			
			$F_{PWM} = 100 \text{ kHz}$		60			
			F _{PWM} = 20 kHz		330			
		.0/	F _{PWM} = 40 kHz		170			
		6% current	F _{PWM} = 60 kHz		140		μs	
constant (L/R)	measurement error due to ripple		$F_{PWM} = 80 \text{ kHz}$		80		""	
			F _{PWM} = 100 kHz		66			
Current measuremen	t accuracy FS = Full Scale				±2	±3	%FS	

4.10 Digital Inputs (IN0, IN1, IN2/LSP, IN3/LSN, IN4, IN5)

			Min.	Тур.	Max.	Units
Mode compliance				N	IPN	
Default state	Input floating (wiring disconnected))		Logic	HIGH	
	Logic "LOW"			1.4	1.8	
Default state	Logic "HIGH"	IN0, IN1, IN4, IN5/ENA	3.1	2.5		
	Hysteresis		0.9	1.1	1.4	V
	Logic "LOW"	IN2/LSP, IN3/LSN		1.4	1.6	
	Logic "HIGH"		4	3.5		
	Hysteresis			0.6		
			4.5			
	Absolute maximum, continuous		-5		NPN gic HIGH 1.8	
la accide acciona indi	Logic "LOW"; Pulled to GND			9	10	Л
input current	Logic "HIGH"; Pulled to +24V				1 1.4 4 1.6 5 1 1.6 5 1 1.6 5 1 1.6 5 1 1.6 5 1 1 1.6 5 1 1 1.6	mA
Input frequency			0		500	kHz
Minimum pulse			1			μs
ESD protection	Human body model		±2			kV

 $^{^1}$ Limited to $3A_{RMS}$ / 4.2A amplitude nominal using the recommended mating connectors; 2 For current values >3A_{RMS} pins needs to be soldered instead of socketed

4.11 Digital Outputs (OUT0, OUT1, OUT4)

				Min.	Тур.	Max.	Unit s
Mode comp	oliance - All outputs (OUT0	, OUT1, OUT4)			NP	N 24V	
	te - Not supplied (+V _{LOG} flo				High-Z	(floating)	
	Logic "LOW"; output co	urrent = 1.5A for OUT0/ 0.0	05A for the other digital			0.4	
Output	Logic "HIGH", external load to Absolute maximum, continuou	urrent = 0, no load		4	4.5	5	
voltage		load to +V _{LOG}			V_{LOG}		V
		ontinuous (free-wheeling di	odes to +V _{LOG} to GND)	-0.5		V _{LOG} +0.5	
	Absolute maximum, su	ırge (duration ≤ 1s) [†]		-1		V _{LOG} +1	
		Continuous Formay	OUT1, OUT4			V _{LOG} +0.5	^
	Logic "LOW", sink	Continuous, 5s max	OUT0			2	Α
Output	current	Dook 0 50 may	OUT1, OUT4			0.15	Α
current		Peak, 0.5s max	OUT0			2] A
	Logic "HIGH", source of	current; external load to GN	ND; V _{OUT} >= 2.0V			5	mA
	Logic "HIGH", leakage	current; external load to +	V_{LOG} ; $V_{OUT} = V_{LOG max} = 40V$		0.05	0.1	mA
Minimum p	ulse width			0.5			μs
ESD protec	tion - Human body model			±15			kV

4.12 Digital Hall Inputs (Hall1, Hall2, Hall3)

			Min.	Тур.	Max.	Units
Mode compliane	се	TTL / CMOS / Open-collector	TTL / CMOS / Open-collector or analog (linear) 05V			
Default state		Input floating (wiring disconnected)	4.5	4.7	5	
	Digital	Logic "LOW"		1.5	1.7	
Input voltage Digita		Logic "HIGH"	3	2.5		V
		Floating voltage (not connected)		0.5		
	Analogue		0	0.54.5	4.95	
la		Logic "LOW"; Pull to GND		2.3		^
input current	ault state		0		mA	
Minimum pulse	width			70		μs
ESD protection		Human body model		±15		kV

4.13 Encoder Inputs (A1+, A1-, B1+, B1-, Z1+, Z1-, A2+, A2-, B2+, B2-)

		Min. Typ. Max. Uni			Units
Single-ended mode compliance	Leave A1-, B1-, Z1-, A2-, B2- floating	TTL	TTL/CMOS/Open-collector (NPN)		
Single-ended threshold	A1+, B1+, Z1+, A2+, B2+	1.2	1.3	1.5	V
Single-ended input current	Input pulled to GND against on-board 2.2 KΩ pull-up to +5V		2.2	2.5	mA
Differential mode compliance	For full RS422 compliance, see ¹		TIA/EI	A-422-A	
	Hysteresis	±0.03	±0.05	±0.2	
Input voltage	Differential mode	-15		+15	V
	Common-mode range (A+ to GND, etc.)	-7		+12	
Input impedance, differential	A+, A2+, B+, B2+, Z+		2.2		kΩ
Input impedance, differential	A-, A2-, B-, B2-, Z-		4.4		K12
Input frequency	Differential mode	0		15	MHz
Minimum pulse width	Differential mode	33			ns
ESD Protection	Human body model	±30			kV

 $^{^{1}}$ Full RS-422 compatibility, as well as noise rejection improvement an 120Ω resistor must be connected across each signal pair (A+/A-, B+/ B-, Z+/Z-) – for Micro 4803 CZ check SW1 settings pins 1,2,3.

4.14 Analog Input (REF,FDBK)

		Min.	Тур.	Max.	Units
4.14.1 05V Mode					
	Operational range	0		4.95	
Input voltage	Absolute maximum values, continuous	-12		+18	V
. 0	Absolute maximum, surge (duration ≤ 1s) [†]			±36	
Input impedance	To 1.447V		20		kΩ
Resolution			12		bits
Integral linearity				±2	bits
Offset error			±2	±10	bits
Gain error			±1%	±3%	% FS ¹
Bandwidth (-3dB)	Software selectable	0		1.5	kHz
ESD protection	Human body model	±2			kV
4.14.2 ±10V Mode					
Differential voltage range			±10		V
Common-mode voltage range	Referenced to GND	-12	010	+50	V
Input impedance	To 1.447V		20		kΩ
Resolution			12		bits
Integral linearity				0.036	%FS ²
Offset error	Common-mode voltage = 010 V		±0.2	±0.5	%FS ²
Gain error	Common-mode voltage = 010 V		±0.5	±3	%FS ²
Bandwidth (-3dB)	Software selectable	0		5.5	kHz

4.15 SSI/BiSS/Panasonic/ EnDAT/Nikon/Sanyo Denki encoder interface

		Min.	Ty p.	Max.	Units
Differential mode compliance(CLOC	K, DATA)	TIA	/EIA-4	22	
CLOCK Output voltage	Differential; 50Ω differential load	2.0	2.5	5.0	V
CLOCK Output voltage	Common-mode, referenced to GND	2.3	2.5	2.7	V
CLOCK frequency	Software selectable	1000, 2000,	3000,40	000	kHz
DATA Input hysteresis	Differential mode	±0.1	±0. 2	±0.5	V
Data input impedance	Termination resistor on-board		12 0		Ω
DATAL	Referenced to GND	-7		+12	.,
DATA Input common mode range	Absolute maximum, surge (duration ≤ 1s) [†]	-25		+25	
		Binary / Gray			
DATA format	Software selectable	Single-t	urn / M	ulti-turn	
		Count	ing dire	ection	
DATA resolution	Single-turn			56	bit
	Multi-turn and single-turn			56	וונ
If total resolution >31 bits	some bits must be ignored by software setting t	o achieve a max 31	bits re	solution	•

4.16 Supply Output (+5V)

		Min.	Тур.	Max.	Units
+5V output voltage	Current sourced = 250mA	4.8	5	5.2	V
+5V output current6F				450	mA
Short-circuit protection		Yes			
Over-voltage protection		NOT protected			
ESD protection	Human body model 0.1nF 1.5 kΩ	±2			kV

¹ "FS" stands for "Full Scale"

4.17 CAN-Bus for CAN executions

			Min.	Тур.	Max.	Units	
Compliance	ISO11898, CiA-301v4.2, CiA 305 v2.2.13, 402v4.1.1						
Bit rate	Software selectable		125		1000	kbps	
Bus length	1Mbps				25		
	500Kbps				100	m	
	≤ 250Kbps				250		
Resistor	Between CAN-Hi, CAN-Lo		none on-board				
	Micro 4803 MZ/PZ-CAN		1-127 & 255 T			TMLCA	
		Hardware: by "IDx" pins		N			
			1-127 & 255(LSS inactive)			CANope	
			n n				
		Software	1 ÷ 127 (CANopen), 1- 255 (TMLCAN)				
Node addressing	Micro 4803 CZ-CAN	Hardware: by SW1	1 & 255			TMLCA	
						N	
						CANope	
		Software	1 ÷ 127 (CANopen);1- 255 (TMLCAN)				
	Micro 4803 HZ-CAN	Software only	1 ÷ 127 (CANopen);1- 255 (TMLCAN)				
Voltage, CAN-Hi or CAN-Lo to GND		-58		58	V		
Voltage, CAN-Hi to CA	N-Lo	·	-45		+45	٧	
ESD protection	Human body model	·	±8			kV	

4.18 EtherCAT ports for CAT execution

			Min.	Тур.	Max.	Units
Standards compliance		IEEE802.3, IEC61158				
Transmission line pecification ¹	According to TIA/EIA-568-5-A		Cat.5e.UTP			
Pinout	EtherCAT® supports MDI/MDI-X auto-crossover		TIA/EIA-568-A or TIA/EIA-568-B			
Software protocols compatibility		CoE, CiA402, IEC61800-7-301				
	Micro 4803	By Software	1 ÷ 255			-
Node addressing	MZ/PZ-CAT	By Hardware via "IDx" pins	1 ÷ 255			-
	Micro 4803 CZ-CAT	By Software	1 ÷ 255			
		By Hardware via SW1 & SW2	1, 128, 129 & 255			
MAC addressing	EtherCAT® uses no MAC address		none			-
ESD protection	Human body model		±15			kV

4.19 Conformity

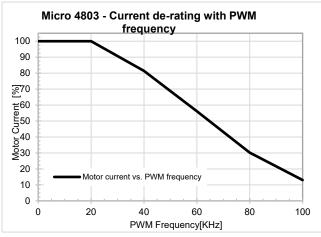
2014/30/EU (EMC), 2014/35/EU (LVD), 2011/65/EU (RoHS),1907/2006/EC (REACH), 93/68/EEC (CE
Marking Directive), EC 428/2009 (non dual-use item, output frequency limited to 590Hz)

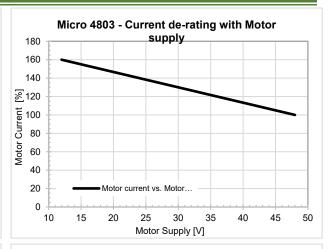
[†] Stresses beyond values listed under "absolute maximum ratings" may cause permanent damage to the device. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

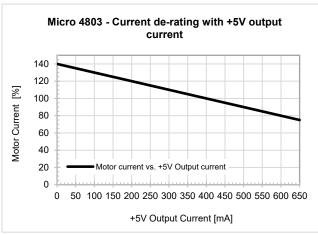
© Technosoft 2023

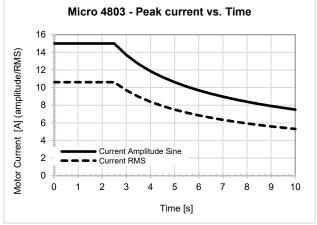
 $^{^{\}rm 1}$ Micro 4803MZ/PZ-CAT EtherCAT connection requires external magnetics. The Micro 4803 CZ-CAT has the magnetics already included in the drive.

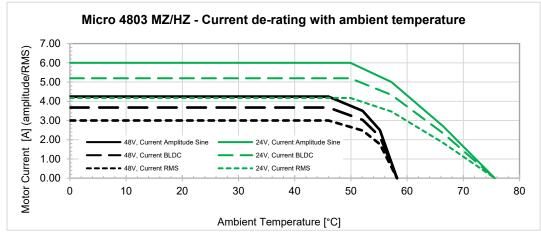
5 De-rating curves

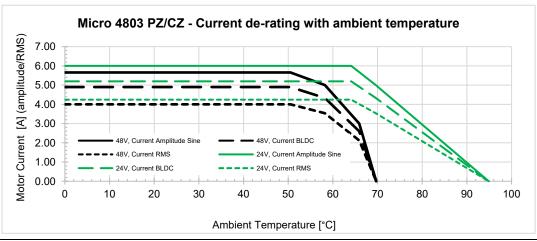


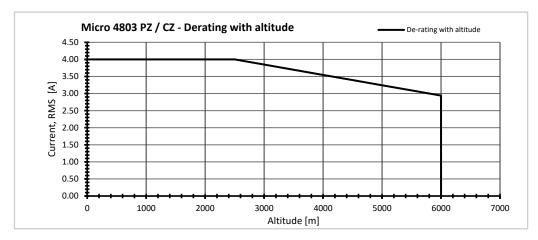


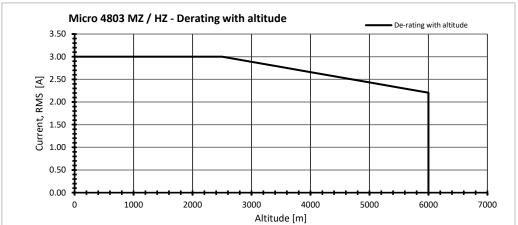












6 Memory Map

Micro 4803 has 2 types of memory available for user applications: 16K×16 SRAM and up to 24K×16 serial E²ROM.

The SRAM memory is mapped in the address range: C000h to FFFFh. It can be used to download and run a TML program, to save real-time data acquisitions and to keep the cam tables during run-time.

The E²ROM is mapped in the address range: 2000h to 7FFFh. It is used to keep in a non-volatile memory the TML programs, the cam tables and the drive setup information.

Remark: EasyMotion Studio handles automatically the memory allocation for each motion application. The memory map can be accessed and modified from the "Memory Settings" dialogue of each application

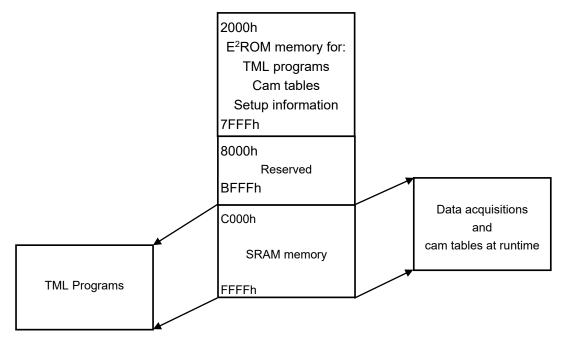


Figure 6-1 Micro 4803 Memory Map

