



Intelligent Servo Drive for Step, DC, Brushless DC and AC Motors **Intelligent Servo Drives**





P091.020.Micro4804.SX.SY.STO.UM.0125

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About This Manual

This book is a technical reference manual for:

Product Name	Part Number	Description	Communication
Micro 4804 SY4	P020.202.E404	4 axis compact motion system	RS232; USB; EtherCAT [®]
Micro 4804 SX4	P020.102.E404	4 axis compact motion system	RS232; USB; CAN
Micro 4804 SY3	P020.202.E403	3 axis compact motion system	RS232; USB; EtherCAT [®]
Micro 4804 SX3	P020.102.E403	5 axis compact motion system	RS232; USB; CAN
Micro 4804 SY4-STO	P020.203.E404	4 axis compact motion system, STO	RS232; USB; EtherCAT [®]
Micro 4804 SX4-STO	P020.103.E404	4 axis compact motion system, STO	RS232; USB; CAN
Micro 4804 SY3-STO	P020.203.E403	3 axis compact motion system, STO	RS232; USB; EtherCAT [®]
Micro 4804 SX3-STO	P020.103.E403	S axis compact motion system, STO	RS232; USB; CAN

In order to operate the Micro 4804 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 master¹ or an EtherCAT® master²
 - □ 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)³
 - □ A TML_LIB motion library for PLCs³
 - □ 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 4804** 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 II – 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 4804** 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

Trademarks

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

¹ When Micro 4804 SX4 drive is set in CANopen mode

² When Micro 4804 SY4 drive is used

³ Available for Micro 4804 SX4

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Micro 4804 SX4-CAN Multi Axis System, Datasheet (P020.102.E404) Micro 4804 SY4-CAT Multi Axis System, Datasheet (P020.202.E404) Micro 4804 SX3-CAN Multi Axis System, Datasheet (P020.102.E403) Micro 4804 SY3-CAT Multi Axis System, Datasheet (P020.202.E403) Micro 4804 SX4-CAN-STO Multi Axis System, Datasheet (P020.103.E404)

Micro 4804 SY4-CAT-STO Multi Axis System, Datasheet (P020.203.E404) Micro 4804 SX3-CAN-STO Multi Axis System, Datasheet (P020.103.E403)

Micro 4804 SY3-CAT-STO Multi Axis System, Datasheet (P020.203.E403)

- describes the hardware connections of the Micro 4804 Multi Axis System family of intelligent servo drives including the technical data and connectors.

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

Help of the EasyMotion Studio II software – EasyMotion Studio II simplifies the setup process for any Technosoft drive, enabling quick configuration. The software generates setup data that can be downloaded into the drive's EEPROM or saved as a file on a PC. Upon power-up, the drive initializes with the setup data read from its EEPROM. Additionally, EasyMotion Studio II allows retrieval of complete setup information from a previously programmed drive. The LITE version of EasyMotion Studio II is available for free download from the Technosoft website.

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 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.*

iPOS family Safe Torque Off (STO) Operating instructions (091.099.STO.Operating.Instructions.xxxx) – describes the principles of STO function, the applied standards, the safety-related data and the electrical data. It presents the requested information for installation and commissioning of STO function

iPOS CANopen Programming (part no. P091.063.*iPOS.UM.xxxx*) – explains how to program the *iPOS* family of intelligent drives using **CANopen** protocol and describes the associated object dictionary for **CiA 301 v.4.2** application layer and communication profile, **CiA WD 305 v.2.2.13** layer settings services and protocols and **CiA DSP 402 v3.0** 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

iPOS CoE Programming (part no. P091.064.UM.xxxx) – 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.

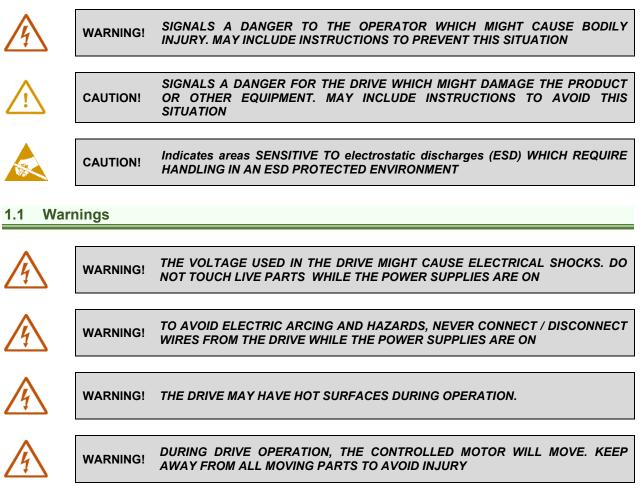
If you want to	Contact Technosoft at			
Visit Technosoft online	World Wide Web: http://www.technosoftmotion.com/			
Receive general information or assistance (see Note)	World Wide Web: <u>http://www.technosoftmotion.com/</u> Email: <u>sales@technosoftmotion.com</u>			
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Make 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:



1.2 Cautions



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

quality austria	IQNet and Quality Austria certification about the implementation and maintenance of the Quality Management System which fulfills the requirements of Standard ISO 9001:2015 .
	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 2014/35/EU Low Voltage Directive (LVD) 93/68/EEC
	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: <u>https://technosoftmotion.com/en/quality/</u>

2 **Product Overview**

2.1 Introduction

The **Micro 4804 Multi-Axis System** is a fully digital, intelligent servo drive solution that integrates the latest DSP technology with an advanced motion controller. This results in outstanding drive performance within a compact form. The system is available in 3- or 4-axis configurations, with an optional Safety Torque Off (STO) feature.

Suitable for controlling **brushless DC**, **brushless AC** (vector control), **DC brushed** motors, and **step** motors, the Micro 4804 accepts various types of position feedback, including incremental encoders (quadrature), absolute encoders (SSI, BiSS, Panasonic, Tamagawa, EnDAT, Nikon, Sanyo Denki), and digital or 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 4804 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:

- Configuring various motion modes (profiles, PVT, PT, electronic gearing¹ or camming¹, etc.)
- Switching between motion modes and adjusting motion parameters.
- Executing homing sequences
- Controlling the program flow through:
 - Conditional jumps and calls of TML functions
 - TML interrupts triggered by pre-defined or programmable conditions (e.g., protection triggers, limit switch transitions, or capture inputs)
 - Waits for programmed events to occur
- □ Managing digital I/O and analog input signals.
- Executing arithmetic and logic operations
- Transferring data between axes
- Controlling the motion of one axis from another via inter-axis motion commands
- Sending commands to a group of axes (multicasting), including the ability to start motion sequences on all axes in the group simultaneously
- Synchronizing all the axes from a network

By implementing motion sequences directly at the drive level, intelligence can be effectively distributed between the master and the drives in complex multi-axis applications, significantly reducing both development time and overall communication requirements. For instance, rather than commanding each movement of an axis individually, the drives can be programmed using TML to execute complex motion tasks autonomously and notify the master upon completion. Consequently, the master's role in controlling each axis is minimized to simply calling TML functions stored in the drive's EEPROM and awaiting a confirmation message indicating the completion of these functions.

All Micro 4804 SY drives ae equipped with an EtherCAT® communication interface that provides support for:

- □ FoE (File-over-EtherCAT)
- EoE (Ethernet-over-EtherCAT)
- CoE (CAN application protocol over EtherCAT)

All Micro 4804 SX drives are equipped with a **CAN 2.0B** interface that can be set to operate in 2 communication protocol modes:

- CANopen

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.

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

For higher-level coordination, besides a master, the Micro 4804 drives can also be controlled via a PC or PLC using one of the **TML_LIB motion libraries**.

For commissioning the Micro 4804, the EasyMotion Studio II PC application is available in two versions: LITE and FULL.

The LITE version simplifies the setup process for any Technosoft drive, enabling quick **commissioning**. It generates setup data that can be downloaded into the drive's EEPROM or saved as a file on a PC. Upon power-up, the drive initializes with the setup data from its EEPROM. Additionally, the LITE version allows for the retrieval of complete setup information from a previously programmed drive and is available for free download from the Technosoft website.

The FULL version of EasyMotion Studio II is designed for commissioning and advanced motion programming. It supports the development of complex motion programs using TML, which are executed locally by the drive's integrated motion controller.

While the LITE version includes only the setup functionality, making it suitable for scenarios where motion programming is managed through a CANopen/EtherCAT master or a PC/PLC using Technosoft's TML_LIB motion libraries, it can be upgraded to the FULL version by entering a **license number** obtained from Technosoft.

2.2 **Product Features**

- Fully digital multi-axis systems suitable for the control of rotary and linear brushless, brushed and 2 or 3phase step motors
- 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
- Output current per axis:
 - **Nominal:** 5.7A_{RMS} / 8A amplitude for PMSM motors
 - 7A for DC / BLDC / Step motors
 - Peak: 11.3A_{RMS} / 16A amplitude
- Thermal Protection: The internal temperature sensor disables the PWM outputs if the measured temperature exceeds 105°C
- STO¹: 2 safe torque-off inputs, safety integrity level (SIL3/Cat3/PLe) acc. to EN61800-5-1; -2/ EN61508-3; -4/ EN ISO 13849-1.
- 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: position or speed profiles, Cyclic Synchronous Position (CSP), Cyclic Synchronous Velocity (CSV), Cyclic Synchronous Torque (CST) and 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/O's per axis:
 - 1 x analogue input, 12-bit, software selectable: 0-5V or ±10V; Reference, Feedback or General purpose
 - 3 x digital inputs: 2 for limit switches + one Enable² / general-purpose¹, NPN, pull-up on-board to +5V. Pull to GND to activate
 - 3 x configurable I/O's, 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) per axis:
 - 1 x Hall sensor interface (digital or linear)

¹ Available only for STO executions (P020.103.E404, P020.103.E403, P020.203.E404 and P020.203.E403)

² Available only for non-STO executions (P020.102.E404, P020.102.E403, P020.202.E404 and P020.202.E403)

- Feedback#1 and Feedback#2 can be:
- Incremental encoder A / B (index Z only for Feedback #1): differential or single-ended;
 Absolute encoder: differential or single-ended encoder. Supported protocols: SSI, BiSS, EnDAT,
- TAMAGAWA, Panasonic, Nikon, Sanyo Denki
- EtherCAT® supported protocols for CAT systems:
 - FoE File over EtherCAT for setup/TML functions and firmware update
 - EoE Ethernet over EtherCAT for Easy Motion communication over EtherCAT
 - CoE CAN application protocol over EtherCAT in conformance with CiA 402 device profile
- 16Kwords SRAM memory per axis for data acquisition
- 24Kwords E2ROM per axis to store setup data, TML motion programs, cam tables and other user data
- Operating ambient temperature: 0-40°C (over 40°C with derating)
- >98% voltage efficiency, >98% power efficiency
- Feature that detects breakage of Hall wires and/or of incremental/absolute encoder wires
- Protections per axis:
 - 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

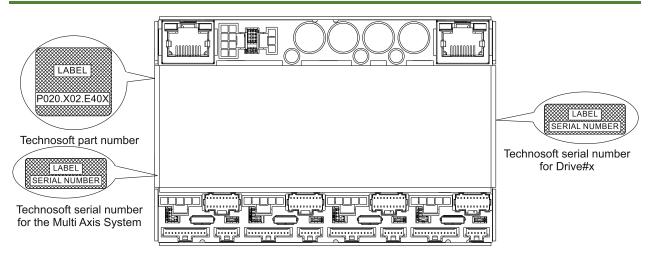


Figure 1 Micro 4804 Multi Axis System identification labels

The Micro 4804 Multi-Axis System can have the following part numbers and names on the identification label:

- P020.202.E404 Micro 4804 SY4 4 Axis Motion System, EtherCAT®
- P020.102.E404 Micro 4804 SX4 4 Axis Motion System, CAN
- P020.202.E403 Micro 4804 SY3 3 Axis Motion System, EtherCAT®
- P020.102.E403 Micro 4804 SX3 3 Axis Motion System, CAN
- P020.203.E404 Micro 4804 SY4-STO 4 Axis Motion System, EtherCAT[®], STO
- **P020.103.E404** Micro 4804 SX4-STO 4 Axis Motion System, CAN, STO
- P020.203.E403 Micro 4804 SY3-STO 3 Axis Motion System, EtherCAT[®], STO
- P020.103.E403 Micro 4804 SX3-STO 3 Axis Motion System, CAN, STO

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

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	sensors				M	Load sensors			
Encoder ¹	Digital Halls	Linear Halls	Tacho	Brushless PMSM ²	Brushless BLDC ³	Brushed DC Voice coils	Stepper 2 phase	Stepper 3 phase	Encoder ⁶
Incremental encoder ⁴ / SSI / EnDAT2.2 / BiSS-C / Tamagawa / Panasonic / Nikon / Sanyo Denki ⁵				~		V	~		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	√			\checkmark	V				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
None							√	√	None

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

³ Trapezoidal. Brushless motor is controlled as a BLDC motor using Hall-based commutation.

⁴ Only differential on Feedback 2

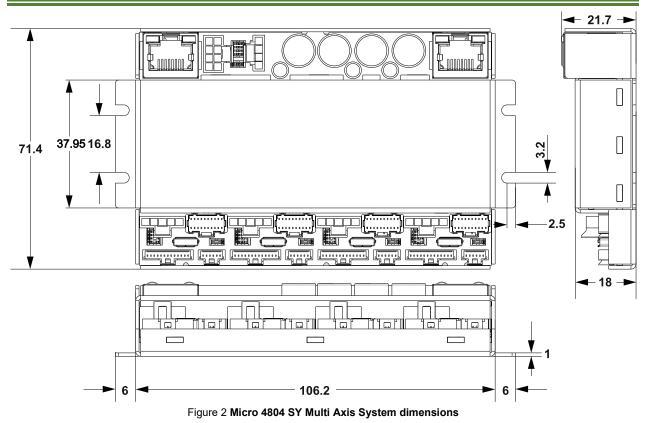
⁵ SSI / EnDAT2.2 / BiSS-C / Tamagawa / Panasonic / Nikon / Sanyo Denki are differential, but single-ended option is also accepted

⁶ Load encoder is on Feedback 2 / 1, if motor encoder is on Feedback 1 / 2

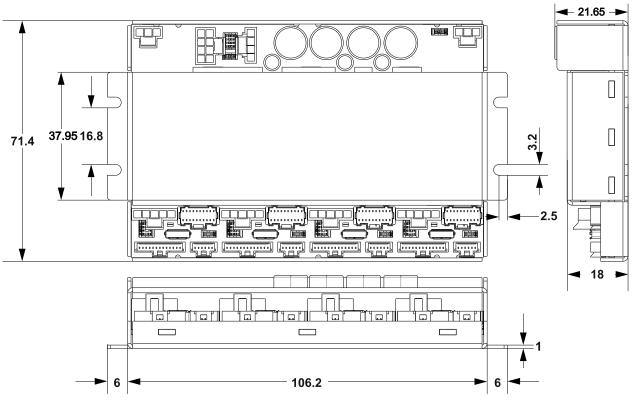
⁷ Load encoder can be only on Feedback 1

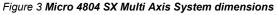
⁸ Load encoder can be only on Feedback 2

3.1 Micro 4804 SY Multi Axis System Dimensions



3.2 Micro 4804 SX Multi Axis System Dimensions





1

2 B/A-0

4 Cr/B-0 PE

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Pir

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17

18

19

20

Pin Name

1 Rsvd

2 GND +Vlog 3

3 C/B+

Pin Name Type

ο A/A+

Name

GND Hall1 +5V

Hall2 +5V

Hall3 EncA1+/EncA1 Dt1+/Dt1 GND

EncA1-/Dt1-

+5V

+5V EncB1+/EncB1 Clk1+/Clk1 EncA2+/EncA2

Dt2+/Dt2

EncB1-/

Clk1-

EncA2-/Dt2-

Z1+

EncB2+/EncB2

Clk2+/Clk2

Z1-

EncB2-

Clk2-

GND

+Vlog

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differential.

Reserved. Do not connect.

<u>J7</u>

Pinouts for Micro 4804 SY4-CAT Multi Axis System 3.3.1

	J9 ECAT OUT
EtherCAT J1 J7 Main Micro 4804 SY4-CAT Multi Axis Sys IN IT IN IT EtherCAT It	tem
J2#1 J3#1 J2#2 J3#2 J2#3 J3#3 J2 111111111111111111111111111111111111	
	4#4 J5#4
Jami Jami Jamz Jamz Jamo Jamo	

J4#x							
Pin	Name	Туре	Description				
1	232TX	0	RS-232 Data Transmission				
2	232RX	1	RS-232 Data Reception.				
3	GND	-	Ground return.				
4	+Vlog	I	Positive terminal of the logic supply input: 6 to 48 Vpc. Internally connected to other +V $_{log}$ pins.				
5	IN2/LSP	-	5-48V digital NPN input. Positive limit switch input.				
6	IN3/LSN	-	5-48V digital NPN input. Negative limit switch input.				
7	I/O0	I/O	5-48V 1.5A NPN (sink) general-purpose digital programmable input IN0 or output OUT0				
8	I/O1	I/O	5-48V 0.1A NPN (sink) general-purpose digital programmable input IN1 or output OUT1				
9	I/O4	I/O	5-48V 0.1A NPN (sink) general-purpose digital programmable input IN4 or output OUT4				
10	IN5/Enable	-	5-48V digital NPN input. Drive Enable input.				
11	GND	-	Ground return. Internally connected to other GND pins.				
12	AnalogIn	1	Analog input (range software selectable 0-5V or ±10V)				
13	+5V	0	Supply for all feedback sensors.				



Reserved - Reserved. Do not connect

Port

Pin	Name	Туре	Description
1,2,3	+Vmot	I	Positive terminal of the motor supply: 7 to 48 V_{DC} . Internally connected to all drives +V_{mot} pins.
4 PE -			Earth connection.
5,6,7	5,6,7 GND -		Ground return. Internally connected to other GND pins.
8 PE -		-	Earth connection

J2#x

Motor+ for DC brush motors Phase B for 3-ph motors, A- for 2-ph steppers, Motor- for DC brush motors

O Phase C for 3-ph motors, B+ for 2-ph steppers Chopping resistor / Phase B- for 2-ph steppers

Description hase A for 3-ph motors, A+ for 2-ph steppers,

> Description Ground return. Internally connected to other GND pins. Digital Hall, or Linear Hall sensor 1. 5V supply for all feedback sensors.

> Sy supply for all feedback sensors. Digital Hall, or Linear Hall sensor 3. Encoder 1 A+ / Data+ diff, input or single-ended input. Set SW1 pin 1 for differential.

Ground return. Encoder 1 A-/Data- diff. input. Set SW1 pin 1 for

Encoder 1 A-/Data- diff. input. Set SWI pin 1 or differential. 5V supply for all feedback sensors. Encoder 1 B+ / Clock+ diff. input or single-ended input. Set SW1 pin 2 for differential. Incr. encoder 2 A / Data+ diff. input or single-ended input. Set SW1 pin 4 for differential. Encoder 1 B- / Clock- diff. input. Set SW1 pin 2 for differential.

Input, set svv1 pin 4 for differential. Encoder 1 b - / Clock- diff. input, Set SW1 pin 2 for differential. Incr. encoder 2 A / Data - diff. input, Set SW1 pin 4 for differential. Incr. encoder 1 Z / Z+ diff. input or single-ended input.

Incr. encoder 1 Z / Z+ diff. input or single-ended input. Set SW1 pin 3 for differential. Encoder 2 B+ / Clock+ diff. input or single-ended input. Set SW2 pin 1 for differential. Incr. encoder 1 Z- diff. input. Set SW1 pin 3 for differential. Encoder 2 B- / Clock- diff. input. Set SW2 pin1 for differential.

 $\begin{array}{l} \mbox{Ground return.} \\ \mbox{Positive terminal of the logic supply input: 6 to 48 Vpc} \\ \mbox{Internally connected to other +V_{log} pins.} \end{array}$

J1

	J6	#x, J8, J 9
Name	Туре	Description
CAT IN		EtherCAT standard RJ45 Ethernet IN p

_ JO	ECATIN		EtherGAT standard RJ45 Ethernet in port.
J9	ECAT OUT	0	EtherCAT standard RJ45 Ethernet OUT port.
J6#x	USB	I/O	Standard Micro USB for PC data transfer

SW

SW1#x – Feedback Resistors selection								
Positi		scriptic		361660				
			onnect	an 1	20Ω resiste	or betwee	n EncA1-	/Dt1- ar
1	En	cA1+/Er	ncA1/Dt	1+/Dt1	feedback pir	IS.		
2		cB1+/Er		k1+/Clk	20Ω resisto 1 feedback p	oins.	n EncB1/	
3			nect an	120Ω re	esistor betwe	en Z1- and	Z1+ feedb	ack pins
4	ON En				20Ω resiste feedback pir		n EncA2-	/Dt2- ar
SW2#x-	- Feedb					10.		
1	ON	1 = C	onnect	an 1	20Ω resisto 2 feedback p		n EncB2/	Clk2- ar
LEDs								
LED1, L	ED2, LE	ED3, LE	D4	Red	EtherCAT®	ERROR in	dicator.	
LED5, L	ED6, LE	ED7, LE	D8	Green	EtherCAT®	RUN indica	ator.	
			SW3	& SW4	- AxisID Se	lection		
SW4		S	W3			Drive /	AxisID	
344	Pin 1	Pin 2	Pin 3	Pin 4	Drive #1	Drive #2	Drive #3	Drive #
off	off	off	off	off	1	2	3	4
off	off	off	off	on	9	10	11	12
off	off	off	on	off	17	18	19	20
off	off	off	on	on	25	26	27	28
off	off	on	off	off	33	34	35	36
off	off	on	off	on	41	42	43	44
off	off	on	on	off	49	50	51	52
off	off	on	on	on	57	58	59	60
off	on	off	off	off	65	66	67	68
off	on	off	off	on	73	74	75	76
off	on	off	on	off	81	82	83	84
off	on	off	on	on	89	90	91	92
off	on	on	off	off	97	98	99	100
off	on	on	off	on	105	106	107	108
off	on	on	on	off	113	114	115	116
off	on	on	on	on	121	122	123	124
on	off	off	off	off	129	130	131	132
on	off	off	off	on	137	138	139	140
on	off	off	on	off	145	146	147	148
on	off	off	on	on	153	154	155	156
on	off	on	off	off	161	162	163	164
on	off	on	off	on	169	170	171	172
on	off	on	on	off	177	178	179	180
on	off	on	on	on	185	186	187	188
on	on	off	off	off	193	194	195	196
on	on	off	off	on	201	202	203	204
on	on	off	on	off	209	210	211	212
on	on	off	on	on	217	218	219	220
on	on	on	off	off	225	226	227	228
on	on	on	off	on	233	234	235	236
on	on	on	on	off	241	242	243	244
on	on	on	on	on	249	250	251	252

	4	PE	-	Earth connection	on	on	
•	Whe	ere "x'	' is t	1, 2, 3 or 4 for Micro 4804 SY4-CAT (P020	202.1	Ξ404)	

Description

Ground return. Internally connected to other GND pins. Positive terminal of the logic supply input: 6 to 48 V_{DC} Internally connected to other +V_{eg} pins.

Earth connection for motor cable shielding **J3#x**

Digital Hall, or Linear Hall sensor 2

3.3.2 Pinouts for Micro 4804 SY3-CAT Multi Axis System

J8	J 9
	ECAT OUT
EthercAT J1 J7 IN IT IT IN IT IN IT In	m EtherCAT
J2#1 J3#1 J2#2 J3#2 J2#3 J3#3 Reser 1 J6#1 J6#2 J6#3 R J6#4 J5#1 J4#2 J5#2 J4#3 J5#3 Reser	

J1

Pin Name Type

Т

Earth connection.

Earth connection

1,2,3 +Vmot

5,6,7 GND PE

4 PE

8

			J4#x
Pin	Name	Туре	Description
1	232TX	0	RS-232 Data Transmission.
2	232RX	I.	RS-232 Data Reception.
3	GND	-	Ground return.
4	+Vlog	I	Positive terminal of the logic supply input: 6 to 48 V _{DC} . Internally connected to other $+V_{log}$ pins.
5	IN2/LSP	-	5-48V digital NPN input. Positive limit switch input.
6	IN3/LSN	l	5-48V digital NPN input. Negative limit switch input.
7	I/O0	I/O	5-48V 1.5A NPN (sink) general-purpose digital programmable input IN0 or output OUT0
8	I/O1	I/O	5-48V 0.1A NPN (sink) general-purpose digital programmable input IN1 or output OUT1
9	I/O4	I/O	5-48V 0.1A NPN (sink) general-purpose digital programmable input IN4 or output OUT4
10	IN5/Enable	I	5-48V digital NPN input. Drive Enable input.
11	GND	-	Ground return. Internally connected to other GND pins.
12	Analogin	I	Analog input (range software selectable 0-5V or ±10V)
13	+5V	0	Supply for all feedback sensors.



Reserved - Reserved. Do not connect

SW1#x - Feedback Resistors selection

J6#x, J8, J9

Port	Name	Type	Description
J8	ECAT IN		EtherCAT standard RJ45 Ethernet IN port.
J9	ECAT OUT	0	EtherCAT standard RJ45 Ethernet OUT port.
J6#x	USB	I/O	Standard Micro USB for PC data transfer

SW

J2 #	X
	Description
0	A . (

Description

Positive terminal of the motor supply: 7 to 48 V_{DC} . Interr connected to all drives +V_{\text{mot}} pins.

Ground return. Internally connected to other GND pins

Pin	Name	Туре	Description
1	A/A+	0	Phase A for 3-ph motors, A+ for 2-ph steppers, Motor+ for DC brush motors
2	B/A-	0	Phase B for 3-ph motors, A- for 2-ph steppers, Motor- for DC brush motors
3	C/B+	0	Phase C for 3-ph motors, B+ for 2-ph steppers
4	Cr/B-	0	Chopping resistor / Phase B- for 2-ph steppers
5	PE	-	Earth connection for motor cable shielding

J3#x

Pin	Name	Туре	Description
1	GND	-	Ground return. Internally connected to other GND pins.
2	Hall1	1	Digital Hall, or Linear Hall sensor 1.
3	+5V	0	5V supply for all feedback sensors.
4	Hall2	1	Digital Hall, or Linear Hall sensor 2.
5	+5V	0	5V supply for all feedback sensors.
6	Hall3	1	Digital Hall, or Linear Hall sensor 3.
7	EncA1+/EncA1 Dt1+/Dt1	Т	Encoder 1 A+ / Data+ diff. input or single-ended input. Set SW1 pin 1 for differential.
8	GND	-	Ground return.
9	EncA1-/Dt1-	I.	Encoder 1 A-/Data- diff. input. Set SW1 pin 1 for differential.
10	+5V	0	5V supply for all feedback sensors.
11	EncB1+/EncB1 Clk1+/Clk1	Т	Encoder 1 B+ / Clock+ diff. input or single-ended input. Set SW1 pin 2 for differential.
12	EncA2+/EncA2 Dt2+/Dt2	I	Incr. encoder 2 A / Data+ diff. input or single-ended input. Set SW1 pin 4 for differential.
13	EncB1-/ Clk1-	I	Encoder 1 B- / Clock- diff. input. Set SW1 pin 2 for differential.
14	EncA2-/Dt2-	I	Incr. encoder 2 A- / Data - diff. input. Set SW1 pin 4 for differential.
15	Z1+	Т	Incr. encoder 1 Z / Z+ diff. input or single-ended input. Set SW1 pin 3 for differential.
16	EncB2+/EncB2 Clk2+/Clk2	I/O	Encoder 2 B+ / Clock+ diff. input or single-ended input. Set SW2 pin1 for differential.
17	Z1-	Т	Incr. encoder 1 Z- diff. input. Set SW1 pin 3 for differential.
18	EncB2-/ Clk2-	I	Encoder 2 B- / Clock- diff. input. Set SW2 pin1 for differential.
19	GND	-	Ground return.
20	+Vlog	I	Positive terminal of the logic supply input: 6 to 48 Vbc. Internally connected to other $+V_{log}$ pins.

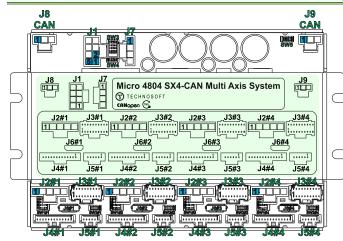
J7Description Reserved. Do not connect. Name Rsvd GND Туре Reserved: Do not connect. Ground return. Internally connected to other GND pins. Positive terminal of the logic supply input: 6 to 48 V_{DC} . Internally connected to other +V_{eq} pins. +Vlog 3 ī PE

SW1#x - Feedback Resistors selection Position Description 0N = 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 EncB1/Clk1- and EncB1/Clk1/Clk1 feedback pins. 4 ON = Connect an 120Ω resistor between EncA2+/FencB1/Clk1/Clk feedback pins. 5 ON = Connect an 120Ω resistor between EncA2//Dt2- and EncA2+/EncA2/Dt2+/Dt2 feedback pins. 5 W2#x- Feedback Resistors selection 1 ON = Connect an 120Ω resistor between EncB2/Clk2- and EncB2/Clk2+/Clk2 feedback pins. LEDS LEDS, LED3, LED4 Red EtherCAT® ERROR indicator. LED5, LED6, LED7, LED8 Green EtherCAT® RUN indicator. SW3 & SW4 - AxisID Selection SW3 Drive AxisID SW4 Pin 1 Pin 2 Pin 3 Pin 4 Drive # Drive #2 Drive #3 of of off off of off off of of on off of of off on 18 19 1 of of off off off on on off 25 27 on off 34 of of on off on 4 42 43 of of off off on on on off on 49 57 50 58 51 59 on off of on off of 65 73 66 67 0 on of of on off 74 81 89 97 of off 82 90 83 91 on on of on off on on of on of off 98 99 or 105 113 106 114 107 115 of of on on on off of on on on 122 130 138 123 131 139 of on or on on 12 off off off 129 137 or of of or on of off 145 146 147 of 153 161 169 154 162 170 155 163 171 off off off on off on on of on on on of on off on of of on off 177 178 179 187 or or 185 193 186 194 on on on on off 195 or on off of 201 209 217 202 210 218 203 211 219 on on off off on off on on on on on off on on off on off 225 233 241 226 234 227 235 243 or on on on off of or on on on on on 242 on or 249 250 251 on or

Where "x" is 1, 2 or 3 for Micro 4804 SY3-CAT (P020.202.E403)

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Pinouts for Micro 4804 SX4-CAN Multi Axis System 3.3.3



J1

J2#x

Phase A for 3-ph motors, A+ for 2-ph steppers.

Motor+ for DC brush motors Phase B for 3-ph motors, A- for 2-ph steppers, Motor- for DC brush motors

O Phase C for 3-ph motors, B+ for 2-ph steppers

Earth connection for motor cable shielding

J3#x

Digital Hall, or Linear Hall sensor 1. 5V supply for all feedback sensors.

Digital Hall, or Linear Hall sensor 2

Set SW1 pin 1 for differential

Chopping resistor / Phase B- for 2-ph steppers

connected to all drives +V_{mot} pins.

Earth connection.

Earth connection

Description Positive terminal of the motor supply: 7 to 48 V_{DC}. Internally

Ground return. Internally connected to other GND pins.

Description

Description

Ground return. Internally connected to other GND pins.

5V supply for all feedback sensors. Digital Hall, or Linear Hall sensor 3. Encoder 1 A+ / Data+ diff. input or single-ended input.

Ground return. Encoder 1 A-/Data- diff. input. Set SW1 pin 1 for

5V supply for all feedback sensors. Encoder 1 B+ / Clock+ diff. input or single-ended input.

Set SW1 pin 2 for differential. Incr. encoder 2 A / Data+ diff. input or single-ended input. Set SW1 pin 4 for differential. Encoder 1 B- / Clock- diff. input. Set SW1 pin 2 for

Set SW2 pin1 for differential. Incr. encoder 1 Z- diff. input. Set SW1 pin 3 fo

differential. Encoder 2 B- / Clock- diff. input. Set SW2 pin1 for

Positive terminal of the logic supply input: 6 to 48 Vpc.

Internally connected to other +Vlog pins

Pin Name Type

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differential

differential

differential

Ground return.

Name GND

Hall1 +5V Hall2

+5V

Hall3 EncA1+/EncA1

Dt1+/Dt1 GND

EncA1-/Dt1

+ov EncB1+/EncB1

Clk1+/Clk1 EncA2+/EncA2 Dt2+/Dt2

EncB1-/

Clk1-

Clk2+/Clk2

Z1-

EncB2-

Clk2-GND

+Vlog

1.2.3 +Vmot

5,6,7 GND

Pin Name Type

4 PE

8 PE

1 $\Delta/\Delta +$

2 B/A-

4 Cr/B-

5

Pin

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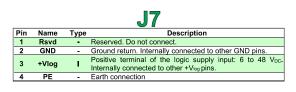
3 C/B+

PE

			J4#X			
Pin	Name	Туре	Description			
1	232TX	0	RS-232 Data Transmission.			
2	232RX	1	RS-232 Data Reception			
3	GND	-	Ground return.			
4	+Vlog	I	Positive terminal of the logic supply input: 6 to 48 V _{DC} . Internally connected to other $+V_{log}$ pins.			
5	IN2/LSP	-	5-48V digital NPN input. Positive limit switch input.			
6	IN3/LSN	1	5-48V digital NPN input. Negative limit switch input.			
7	I/O0	I/O	5-48V 1.5A NPN (sink) general-purpose digital programmable input IN0 or output OUT0			
8	I/O1	I/O	5-48V 0.1A NPN (sink) general-purpose digital programmable input IN1 or output OUT1			
9	I/O4	I/O	5-48V 0.1A NPN (sink) general-purpose digital programmable input IN4 or output OUT4			
10	IN5/Enable	1	5-48V digital NPN input. Drive Enable input.			
11	GND		Ground return. Internally connected to other GND pins.			
12	Analogin		Analog input (range software selectable 0-5V or ±10V)			
13	+5V	0	Supply for all feedback sensors.			



USB I/O Standard Micro USB for PC data transfer



J8, J9						
Pin	Name	Туре	Description			
1	GND	-	Ground return.			
2	Can Lo	I/O	CAN-Bus negative line (dominant low)			
3	Can Hi	I/O	CAN-Bus positive line (dominant high)			

SW

SW1#x - F			selection	1				
Position	Descrip							
1				0Ω resisto edback pins		n EncA1	-/Dt1-	and
2		Connect)Ω resisto feedback pi		n EncB1/	Clk1-	and
3				stor betwee		Z1+ feedb	ack pin	s.
4				0Ω resisto edback pins		n EncA2	-/Dt2-	and
SW2#x – F	eedback	Resistors	selection	1				
1	EncB2+	/EncB2/CI	2+/Clk2	0Ω resisto feedback pi		n EncB2/	Clk2-	and
SW5 – CAN								
1			120Ω res	istor betwee	en CAN Hi	and CAN L	_o signa	als.
SW4 – Prot	tocol sele	ection						
1		CANOpen r MLCAN mo						
SW3 - Axis								
	SV	V3			Drive	AxisID		
Pin 1	Pin 2	Pin 3	Pin 4	Drive #1	Drive #2	Drive #3	Drive	#4
off	off	off	off	1	2	3	4	
off	off	off	on	9	10	11	12	
off	off	on	off	17	18	19		
off	off				18	19	20	
	011	on	on	25	26	27	20 28	
off	on	on off	on off					
off off				25	26	27 35 43	28	
	on	off	off	25 33	26 34	27 35	28 36	
off	on on on on	off off	off on off on	25 33 41	26 34 42	27 35 43 51 59	28 36 44	
off off	on on on	off off on	off on off	25 33 41 49 57 65	26 34 42 50	27 35 43 51	28 36 44 52	
off off off	on on on on	off off on on	off on off on off off	25 33 41 49 57	26 34 42 50 58	27 35 43 51 59	28 36 44 52 60	
off off off on	on on on on off off off	off off on on off	off on off on off	25 33 41 49 57 65 73 81	26 34 42 50 58 66 74 82	27 35 43 51 59 67 75 83	28 36 44 52 60 68 76 84	
off off off on on	on on on off off	off off on on off off	off on off on off on off on	25 33 41 49 57 65 73 81 89	26 34 42 50 58 66 74	27 35 43 51 59 67 75	28 36 44 52 60 68 76	
off off off on on on	on on on on off off off	off off on off off off on	off on off on off on off	25 33 41 49 57 65 73 81	26 34 42 50 58 66 74 82	27 35 43 51 59 67 75 83 91 99	28 36 44 52 60 68 76 84	
off off off on on on on	on on on off off off off	off off on off off off on on	off on off on off on off on off on	25 33 41 49 57 65 73 81 89 97 105	26 34 42 50 58 66 74 82 90 98 106	27 35 43 51 59 67 75 83 91 99 107	28 36 44 52 60 68 76 84 92 100 108)
off off on on on on on on	on on on off off off off off	off off on off off off on on off	off on off on off on off on off	25 33 41 49 57 65 73 81 89 97	26 34 42 50 58 66 74 82 90 98	27 35 43 51 59 67 75 83 91 99	28 36 44 52 60 68 76 84 92 100) 3

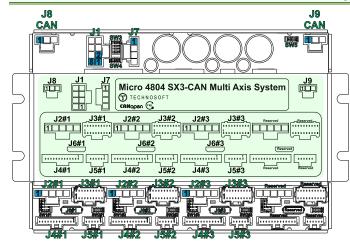
J5#x Reserved - Reserved. Do not connect.

Where "x" is 1, 2, 3 or 4 for Micro 4804 SX4-CAN (P020.102.E404)

OIR I-		differential.
EncA2-/Dt2-	I	Incr. encoder 2 A- / Data - diff. input. Set SW1 pin 4 for differential.
Z1+	I	Incr. encoder 1 Z / Z+ diff. input or single-ended input. Set SW1 pin 3 for differential.
EncB2+/EncB2	1/0	Encoder 2 B+ / Clock+ diff. input or single-ended input.

14

3.3.4 Pinouts for Micro 4804 SX3-CAN Multi Axis System



			J4#x						
Pin	Name	Туре	Description						
1	232TX	0	RS-232 Data Transmission.						
2	232RX	1	RS-232 Data Reception.						
3	GND	-	Ground return.						
4	+Vlog	I	Positive terminal of the logic supply input: 6 to 48 V _{DC} . nternally connected to other + V_{log} pins.						
5	IN2/LSP	-	5-48V digital NPN input. Positive limit switch input.						
6	IN3/LSN	1	5-48V digital NPN input. Negative limit switch input.						
7	I/O0	I/O	5-48V 1.5A NPN (sink) general-purpose digital programmable input IN0 or output OUT0						
8	I/O1	I/O	5-48V 0.1A NPN (sink) general-purpose digital programmable input IN1 or output OUT1						
9	I/O4	I/O	5-48V 0.1A NPN (sink) general-purpose digital programmable input IN4 or output OUT4						
10	IN5/Enable	1	5-48V digital NPN input. Drive Enable input.						
11	GND	-	Ground return. Internally connected to other GND pins.						
12	Analogin	1	Analog input (range software selectable 0-5V or ±10V)						
13	+5V	0	Supply for all feedback sensors.						



USB I/O Standard Micro USB for PC data transfer

J 7										
Pin	Name	Туре	Description							
1	Rsvd	-	Reserved. Do not connect.							
2	GND	-	Ground return. Internally connected to other GND pins.							
3	+Vlog	I.	Positive terminal of the logic supply input: 6 to 48 $V_{\text{DC}}.$ Internally connected to other +V $_{\text{log}}$ pins.							
4	PE	-	Earth connection							

J8, J9								
Pin	Name	Туре	Description					
1	GND		Ground return.					
2	Can Lo	I/O	CAN-Bus negative line (dominant low)					
3	Can Hi	I/O	CAN-Bus positive line (dominant high)					

SW

	Feedback		selection								
Position											
1		Connect +/EncA1/Dt		Ω resistor dback pins.	between	EncA1-/Dt1-	and				
2	ON = EncB1+			Ω resistor eedback pin:		EncB1/Clk1-	and				
3						+ feedback p	ins.				
4		Connect +/EncA2/Dt		Ω resistor dback pins.	between	EncA2-/Dt2-	an				
SW2#x – I	Feedback	Resistors	selection								
1		Connect /EncB2/Cl		Ω resistor eedback pin:		EncB2/Clk2-	an				
SW5 – CA		ors selection									
1	ON = 0	Connect an	120Ω resis	stor betweer	I CAN Hi an	id CAN Lo sig	nals				
SW4 – Pro	otocol sel	ection									
1		CANOpen I MLCAN mo									
SW3 - Axi	sID select	tion									
	SW3 Drive AxisID										
		113			Drive AX	ISID					
Pin 1	Pin 2	Pin 3	Pin 4	Drive #1	Drive #	#2 Drive	#3				
Pin 1 off			Pin 4 off	Drive #1 1			#3				
	Pin 2	Pin 3			Drive #	#2 Drive	#3				
off off off	Pin 2 off	Pin 3 off	off	1	Drive #	#2 Drive 3 11 19	#3				
off off	Pin 2 off off	Pin 3 off off	off on	1 9	Drive # 2 10	#2 Drive 3 11	#3				
off off off	Pin 2 off off off	Pin 3 off off on	off on off	1 9 17	Drive # 2 10 18	#2 Drive 3 11 19	#3				
off off off off	Pin 2 off off off off	Pin 3 off off on on	off on off on	1 9 17 25	Drive # 2 10 18 26	#2 Drive 3 11 19 27 35 43	#3				
off off off off off	Pin 2 off off off off off on	Pin 3 off off on on off	off on off on off	1 9 17 25 33	Drive # 2 10 18 26 34	#2 Drive 3 11 19 27 35	#3				
off off off off off off	Pin 2 off off off off on on	Pin 3 off off on on off off	off on off on off on	1 9 17 25 33 41	Drive 7 2 10 18 26 34 42	#2 Drive 3 11 19 27 35 43	#3				
off off off off off off off	Pin 2 off off off off on on on	Pin 3 off off on on off off on	off on off on off on off	1 9 17 25 33 41 49	Drive # 2 10 18 26 34 42 50	*2 Drive 3 11 19 27 35 43 51	#3				
off off off off off off off off	Pin 2 off off off on on on on	Pin 3 off off on off off off on on	off on off on off on off on	1 9 17 25 33 41 49 57	Drive # 2 10 18 26 34 42 50 58	#2 Drive 3 11 19 27 35 43 51 59	#3				
off off off off off off off off off	Pin 2 off off off on on on on on	Pin 3 off off on off off on on off	off on off on off on off on off	1 9 17 25 33 41 49 57 65	Drive # 2 10 18 26 34 42 50 58 66	Drive 3 11 19 27 35 43 51 59 67 75 83	#3				
off off off off off off off on on	Pin 2 off off off on on on on off off	Pin 3 off off on off off on off off	off on off on off on off on off on	1 9 17 25 33 41 49 57 65 73	Drive 3 2 10 18 26 34 42 50 58 66 66 74	Z Drive 3 11 19 27 35 43 51 59 67 75	#3				
off off off off off off off on on on	Pin 2 off off off on on on on off off	Pin 3 off off on off off off on off off off o	off on off on off on off on off on	1 9 17 25 33 41 49 57 65 73 81	Drive 3 2 10 18 26 34 42 50 58 66 66 74 82	Drive 3 11 19 27 35 43 51 59 67 75 83	#3				
off off off off off off off on on on on	Pin 2 off off off on on on on off off off	Pin 3 off off on off off off off off off off	off on off on off off on off on off on off on	1 9 17 25 33 41 49 57 65 73 81 89	Drive # 2 10 18 26 34 42 50 58 66 66 66 74 82 90	Drive 3 11 19 27 35 43 51 59 67 75 83 91					
off off off off off off off off on on on on	Pin 2 off off off off on on on on off off off	Pin 3 off off on off off on off off off off o	off on off on off off on off on off on off	1 9 17 25 33 41 49 57 65 73 81 89 97	Drive # 2 10 18 26 34 42 50 58 66 74 74 82 90 98	Drive 3 11 19 27 35 43 51 59 67 75 83 91 99					

Earth connection. Ground return. Internally connected to other GND pins. Earth connection

Pin Name Type

1

1,2,3 +Vmot

5,6,7 GND 8 PE

4 PE

J1

 $\label{eq:Description} \hline Positive terminal of the motor supply: 7 to 48 V_{DC}. Internally connected to all drives +V_{mot} pins.$

	J2#x									
Pin	Name	Туре	Description							
1	A/A+	0	Phase A for 3-ph motors, A+ for 2-ph steppers, Motor+ for DC brush motors							
2	B/A-	0	Phase B for 3-ph motors, A- for 2-ph steppers, Motor- for DC brush motors							
3	C/B+	0	Phase C for 3-ph motors, B+ for 2-ph steppers							
4	Cr/B-	0	Chopping resistor / Phase B- for 2-ph steppers							
5	PE	-	Earth connection for motor cable shielding							

J3#x

Pin	Name	Туре	Description
1	GND	-	Ground return. Internally connected to other GND pins.
2	Hall1	I	Digital Hall, or Linear Hall sensor 1.
3	+5V	0	5V supply for all feedback sensors.
4	Hall2		Digital Hall, or Linear Hall sensor 2.
5	+5V	0	5V supply for all feedback sensors.
6	Hall3		Digital Hall, or Linear Hall sensor 3.
7	EncA1+/EncA1 Dt1+/Dt1	I	Encoder 1 A+ / Data+ diff. input or single-ended input. Set SW1 pin 1 for differential.
8	GND	-	Ground return.
9	EncA1-/Dt1-	I	Encoder 1 A-/Data- diff. input. Set SW1 pin 1 for differential.
10	+5V	0	5V supply for all feedback sensors.
11	EncB1+/EncB1 Clk1+/Clk1	I.	Encoder 1 B+ / Clock+ diff. input or single-ended input. Set SW1 pin 2 for differential.
12	EncA2+/EncA2 Dt2+/Dt2	I	Incr. encoder 2 A / Data+ diff. input or single-ended input. Set SW1 pin 4 for differential.
13	EncB1-/ Clk1-	I	Encoder 1 B- / Clock- diff. input. Set SW1 pin 2 for differential.
14	EncA2-/Dt2-	I	Incr. encoder 2 A- / Data - diff. input. Set SW1 pin 4 for differential.
15	Z1+	I	Incr. encoder 1 Z / Z+ diff. input or single-ended input. Set SW1 pin 3 for differential.
16	EncB2+/EncB2 Clk2+/Clk2	I/O	Encoder 2 B+ / Clock+ diff. input or single-ended input. Set SW2 pin1 for differential.
17	Z1-	I	Incr. encoder 1 Z- diff. input. Set SW1 pin 3 for differential.
18	EncB2-/ Clk2-	I	Encoder 2 B- / Clock- diff. input. Set SW2 pin1 for differential.
19	GND	-	Ground return.
20	+Vlog	I	Positive terminal of the logic supply input: 6 to 48 Vbc. Internally connected to other $+V_{log}$ pins.

Reserved - Reserved. Do not connect.

• Where "x" is 1, 2, or 3 for Micro 4804 SX3-CAN (P020.102.E403)

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ARAA SVA CAT STO Multi Avia 3.3.

3.5	Pinc	outs for	Mio	cro 48	04 SY	4-CAT	STO Mu	lti .	Axi	s Sy	yster	n			
	J8 ECAT I	N					J9 ECAT O	UT						J	4#>
1 11			V3			\frown		- 1		Pin	Name	Туре			
111	╒┛╹	╤║┽┽╬		(M M	() <i>(</i>		71		1	232TX 232RX	0			Transmis
	P nonnon P				\land			ΦH		3	GND	-		d return	Receptic
H				-0–	C	$\simeq 0^{2}$		╝╟							inal of th
					10					4	+Vlog	1	Intern	ally conr	nected to
	EtherCAT	<u>أ أأ أ</u>	Micro	4804 SY4	4-CAT-STO	Multi Axis	System EtherCA	AT		5	IN2/LSP				VPN inpu
511	IN	FF 1 H I		HNOSOFT			Ουτ	-		6	IN3/LSN	I			VPN inpu
			Ether CAT:	≠						7	I/O0	I/O	5-48V		NPN e input IN
	J2#1	_J3#1_	J2#2	_J3#2	J2#3	_J3#3_	J2#4 _J3#4_	\mathbb{C}					5-48V		
			1			1				8	I/O1	I/O			e input IN
				IC#2		······································		91		9	I/O4	I/O	5-48V		
	č	J6#1	Ċ	J6#2	<u></u>		J6#4						progra	ammable	e input IN
				11]	1	1			10	IN5	I	5-48V	digital N	VPN gen
	J4#1		J4#2	J5#2		 	J4#4 J5#4			11 12	GND	-			. Interna
		1944		19419	10460		J2#4 J3#	in the		13	Analogir +5V	0			range so feedback
										Pin	Name	Туре		J	5#>
	Jari	19441	Jampa	. Jo#4	. J444-3	1040	1 4464 194	gyay.					Safe 1		Off input
					J1					1	STO2-	1			ırn (opt
	Pin	Name Type			Descr	intion		1						ed, 0V)	
	FIII	Name Type	Desiti	. An annal an all		-	40 M Justana alli			2	STO2+	i.		orque C re inpu	Off input ut (opt
	1,2,3	+Vmot I			rives +V _{mot} pi		48 V _{DC} . Internally			2	3102+			ed, 18÷4	
	4	PE -		connection.	inves i vinot pi	113.		1		3					
	5,6,7	GND			ernally conne	ected to other	GND nins	1		4	PE	-	Earth	connect	ion
	8	PE -		connection	contaily conne		OND pind.	1							Off input
			Lichterr					1		5	STO1+	1			ut (opt
														ed, 18÷4	OV) Off input
								1 I		6	STO1-	1			ırn (opt
	Pin N	ame Type			Descri								isolate		
	1 4				otors, A+ for	2-ph stepper	s,								
				for DC brus	n motors otors, A- for 2	2-nh etenner	,	-							
	2 1			or DC brush		z-pii stepper	,							0	SW
	3 (otors, B+ for	2-nh stenner	·s	1						0	₽₩₩
					Phase B- for					SW1#x	– Feedb	ack Res	sistors	selection	on
							s	1		Posit		scriptio			
	5	PE - E	arth co	onnection to	r motor cable	snielding				1			onnect		20Ω re
					355X						En	cA1+/En			
	Dia	Mana	T					1		2					
	Pin 1	Name GND	Туре	Ground ret		scription	o other GND pins.			3		cB1+/En I = Conn			
	2	Hall1			I, or Linear Ha		o uner GND pins.				01		onnect		20Ω re
	3	+5V	Ó		for all feedba					4		cA2+/En			
	4	Hall2			l, or Linear Ha					SW2#x	- Feedb				
	5	+5V	0		for all feedba					1			onnect		20Ω re
	6	Hall3	<u> </u>		I, or Linear Ha						En	cB2+/En	ncB2/CI	k2+/Clk2	2 feedba
	7 5	ncA1+/EncA1 Dt1+/Dt1	1		A+ / Data+ d		ngle-ended input.			LEDs					
	8	GND	-	Ground ret		ential.					LED2, LE				EtherCA EtherCA
		EncA1-/Dt1-	1			ff. input. Se	t SW1 pin 1 for			LED5,	LED6, LE	D7, LE	S/W/3	Sieen	- AxisID
				differential								SI	N3	4 0114	ANISID
	10	+5V	0		for all feedba					SW4	Pin 1	Pin 2	Pin 3	Pin 4	Drive
	11 -	ncB1+/EncB1 Clk1+/Clk1	1	Encoder 1 Set SW1 n	B+ / Clock+ c	im. Input or si antial	ngle-ended input.			off	off	off	off	off	1
	. E	ncA2+/EncA2					t or single-ended			off	off	off	off	on	9
	12 -	Dt2+/Dt2	1	input. Set \$	SW1 pin 4 for	differential.	-			off	off	off	on	off	17
	13	EncB1-/	I	Encoder 1	B- / Clock-		et SW1 pin 2 for			off	off	off	on	on	25
		Clk1-		differential		diff in a f	Pot PW/1 -:- 4/			off	off	on	off	off	33
	14	EncA2-/Dt2-	I	differential		a - unit, input,	Set SW1 pin 4 for			off off	off off	on on	off on	on off	41 49
	47	74				iff. input or si	ngle-ended input.			off	off	on	on	on	57
	15	Z1+	1	Set SW1 p	in 3 for different	ential.				off	on	off	off	off	65
	16 E	ncB2+/EncB2	I/O				ngle-ended input.			off	on	off	off	on	73
		Clk2+/Clk2			in1 for differe		SW1 pin 3 for			off	on	off	on	off	81
	17	Z1-	1	differential		r. input. Sei	SWI pin 3 for			off	on	off	on	on	89
		EncB2-/				diff. input. S	Set SW2 pin1 for			off	on	on	off	off	97
	18	Clk2-	1	differential						off	on	on	off	on	105
	19	GND		Ground ret	turn.					off off	on	on on	on on	off on	<u>113</u> 121
	20	+Vlog	I				nput: 6 to 48 Vpc.			on	off	off	off	off	129
	L	-		mernally c	connected to	Juliel ⊤Vlog DII	15.	1		on	off	off	off	on	137
				۹.						on	off	off	on	off	145
	Pin	Name Typ	е		Desci	ription]			on	off	off	on	on	153
	1	Rsvd -		erved. Do no						on	off	on	off	off	161
	2	GND -	Grou	ind return. Ii	nternally conr					on	off	on	off	on	169
	3	+Vlog l					ut: 6 to 48 V _{DC} .			on	off	on	on	off	177
	4	-			cted to other	+Viog pins.				on	off	on	on	on off	185 193
	4	PE -	-	n connectior						on on	on on	off off	off off	on	201
			_ [[674X	, J8, ,					on	on	off	on	off	201
					+					on	on	off	on	on	203
	Port	Name	Ту			escription				on	on	on	off	off	225
	J8	ECAT IN	_		AT standard F					on	on	on	off	on	233
	J9	ECAT OU			AT standard F					on	on	on	on	off	241
	J6#x	USB	I/	O Standar	rd Micro USB	for PC data f	ransfer			on	on	on	on	on	249

Description

	23217	0									
2	232RX	1	RS-232 Data Reception.								
3	GND	-	Ground return.								
4	+Vlog	I	Positive terminal of the logic supply input: 6 to 48 V _{DC} . Internally connected to other + V_{log} pins.								
5	IN2/LSP	1	5-48V digital NPN input. Positive limit switch input.								
6	IN3/LSN	1	5-48V digital NPN input. Negative limit switch input.								
7	I/O0	I/O	5-48V 1.5A NPN (sink) general-purpose digital programmable input IN0 or output OUT0								
8	I/O1	I/O	5-48V 0.1A NPN (sink) general-purpose digital programmable input IN1 or output OUT1								
9	I/O4	I/O	5-48V 0.1A NPN (sink) general-purpose digital programmable input IN4 or output OUT4								
10	IN5	1	5-48V digital NPN general-purpose input								
11	GND	-	Ground return. Internally connected to other GND pins.								
12	AnalogIn	1	Analog input (range software selectable 0-5V or ±10V)								
13	+5V	0	Supply for all feedback sensors.								

X

Pin	Name	Type	Description									
1	STO2-	I	Safe Torque Off input 2, negative return (opto- isolated, 0V) DC from SELV/ PELV power									
2	STO2+	I	Safe Torque Off input 2, supply for motor PWM output positive input (opto-operation isolated, 18+40V)									
3 4	PE	-	Earth connection									
5	STO1+	I	Safe Torque Off input 1, Apply between both STO1+, positive input (opto STO2+ and STO1-, STO2 24V isolated, 18+40V)									
6	STO1-	Т	Safe Torque Off input 1, negative return (opto- isolated 0V)									

SW1#x				selecti	on		_				
Positi		scriptio									
1		I = C cA1+/Er			20Ω resisto eedback pin		n EncA1-	/Dt1- ar			
2	ON En		onnect ncB1/Cll		20Ω resisto 1 feedback p		n EncB1/	Clk1- ar			
3					sistor betwe		Z1+ feedb	ack pins			
4					20Ω resisto		n EncA2-	/Dt2- ar			
					eedback pin	S.					
SW2#x- Feedback Resistors selection ON = Connect an 120Ω resistor between EncB2/Clk2- and											
1					20Ω resisto 2 feedback p		n EncB2/	Clk2- ar			
LEDs											
LED1, LED2, LED3, LED4 Red EtherCAT® ERROR indicator.											
LED5, L	ED6, LI	ED7, LE			EtherCAT®		ator.				
				& SW4	 AxisID Sel 						
SW4			W3			Drive /					
	Pin 1	Pin 2	Pin 3	Pin 4	Drive #1	Drive #2	Drive #3	Drive #			
off	off	off	off	off	1	2	3	4			
off	off	off	off	on	9	10	11	12			
off	off	off	on	off	17	18	19	20			
off	off	off	on	on	25	26	27	28			
off	off	on	off	off	33	34	35	36			
off	off	on	off	on	41	42	43	44			
off	off	on	on	off	49	50	51	52			
off	off	on	on	on	57	58	59	60			
off	on	off	off	off	65	66 74	67	68 76			
off	on	off	off	on	73	82	75				
off off	on	off	on	off on	81 89	90	<u>83</u> 91	84 92			
off	on on	on	on	off	97	98	99	100			
off	on	on	off	on	105	106	107	100			
off	on	on	on	off	113	114	115	116			
off	on	on	on	on	121	122	123	124			
on	off	off	off	off	129	130	131	132			
on	off	off	off	on	137	138	139	140			
on	off	off	on	off	145	146	147	148			
on	off	off	on	on	153	154	155	156			
on	off	on	off	off	161	162	163	164			
on	off	on	off	on	169	170	171	172			
on	off	on	on	off	177	178	179	180			
on	off	on	on	on	185	186	187	188			
on	on	off	off	off	193	194	195	196			
on	on	off	off	on	201	202	203	204			
on	on	off	on	off	209	210	211	212			
on	on	off	on	on	217	218	219	220			
on	on	on	off	off	225	226	227	228			
on	on	on	off	on	233	234	235	236			
on	on	on	on	off	241	242	243	244			
on	on	on	on	on	249	250	251	252			

Where "x" is 1, 2, 3 or 4 for Micro 4804 SY4-CAT STO (P020.203.E404) •

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3.3.6 Pinouts for Micro 4804 SY3-CAT-STO Multi Axis System

3.3.6	Pir	nouts fo	or Mi	icro 4804 SY3	-CAT-STO	Mult	ti Axi	s Sy	vstem					
	J8 ECAT			,	EC	J9 AT OU	T				J	1# x		
П	í 🕞		\$W3.				สัก	Pin	Name	Туре			ription	
							11	1	232TX		RS-232 Data			
	ll 🖁 noon	┉╏║╤╬╌						2	232RX		RS-232 Data I			
			SW4 🖳				1	3	GND		Ground return			0.1.10.11
ſ	EtherCAT	<u>J1 J7</u>	Minu	4004 EV2 CAT STO M.		EtherCAT		4	+Vlog	1	Internally conr	hal of the log	ic supply input: +Vice pins	6 to 48 Vpc.
	L/A		Micro	ο 4804 SY3-CAT-STO Μι	liti Axis System			5	IN2/LSP				itive limit switch	input.
	IN		EtherCAT	CHNOSOFT ➡ Ma		OUT		6	IN3/LSN				ative limit switch	
					12#2			7	I/O0	1/0	5-48V 1.5A	NPN (sinl	<) general-pur	
			J2#:		J3#3 Reserved			'	1/00		programmable			
			9					8	I/O1		5-48V 0.1A programmable		<) general-pur	pose digital
		J6#1		J6#2J6#3	Reserv	ed							<) general-pur	pose digital
\supset					1	í	$\parallel \subset$	9	I/O4	I/O	programmable			P
	J4				J5#3 Reserved	'S 21		10	IN5/Enable	• I	5-48V digital N	IPN input. Driv	e Enable input.	
		3#1		10.00	1949			11	GND				nected to other	
						Beserved	5	12	AnalogIn			•	selectable 0-5	/ or ±10V)
			t					13	+5V	0	Supply for all f	eedback sens	ors.	
u		1_1541	144	2 J5#2 J4#3	1543		_ ч	Pin	Name	Туре		Desc	ription	
	- m		-vnři	4				1	STO2-		Safe Torque C	ff input 2, App	ly between	both STO1+,
				V I				1	3102-		(V/0 bateloai	510	02+ and \$101	-, STO2- 24V
	Pin	Name Typ		Descript							Safe Torque C	off input 2, DC	from SELV/	PELV power
	1.2.3	3 +Vmot		ve terminal of the motor sup		ternally		2	STO2+	I	positive inpu	t (opto- sup	from SELV/ ply for motor ration	i vvivi output
			conne	ected to all drives +V _{mot} pins.				-			isolated, 18+4	JV) Ope		
	4	PE -		connection.	d to other CND circ			3	PE		Earth connecti			
	5,6,7	7 GND - PE -		nd return. Internally connecte connection	a to other GND pins			-			Safe Torque C	ff input 1.	hi hati i	bath offort
	8	FC -	Lanti					5	STO1+	1	positive inpu	t (opto App	ly between 1	5101+, STO2-24V
				JZ#X							isolated, 18+4	DV) DC	from SELV/	PELV power
								6	STO1-	1	Sate Lorque C	rn (onto- sup	from SELV/ ply for motor ration	PWM output
	Pin	Name Type		Description					3101-		isolated, 0V)	ope	ration	
	1	A/A+ O		A for 3-ph motors, A+ for 2-p for DC brush motors	oh steppers,									
				B for 3-ph motors, A- for 2-p	h stenners							SWW .		
	2	B/A- O		for DC brush motors	i otoppolo,			CIAIA	. Casellas	al Deal				
	3	C/B+ O	Phase	C for 3-ph motors, B+ for 2-p	oh steppers				tion Des		istors selection	n		
	4	Cr/B- O	Choppi	ing resistor / Phase B- for 2-	oh steppers				ON			20Ω resistor	between End	cA1-/Dt1- and
	5	PE -		connection for motor cable sh				1	Enc	A1+/Enc	cA1/Dt1+/Dt1 f	eedback pins.		
				24				2	ON	= Co	nnect an 12	0Ω resistor	between End	B1/Clk1- and
				JOHX				3			B1/Clk1+/Clk1		s. n Z1- and Z1+ fe	edback nins
	Pin	Name	Туре		ription				ON				between End	
	1	GND Hall1	-	Ground return. Internally co Digital Hall, or Linear Hall s		D pins.		4	Enc.	A2+/Enc	cA2/Dt2+/Dt2 f	eedback pins.		
	3	+5V	ò	5V supply for all feedback				SW2#			stors selectio			P.0 (0) 0
	4	Hall2		Digital Hall, or Linear Hall				1			nnect an 12 cB2/Clk2+/Clk2		between End	B2/Clk2- and
	5	+5V	0	5V supply for all feedback				LEDs	LIIG			Teeuback pin	o.	
	6	Hall3 EncA1+/EncA	1	Digital Hall, or Linear Hall Encoder 1 A+ / Data+ diff.		d input			LED2, LEI	D3, LED	4 Red	EtherCAT® El	RROR indicator	
	7	Dt1+/Dt1	` ' I	Set SW1 pin 1 for different		a input.		LED5,	LED6, LEI	D7, LED	8 Green	EtherCAT® R	UN indicator.	
	8	GND	-	Ground return.										
	9	EncA1-/Dt1	- 1	Encoder 1 A-/Data- diff. differential.	input. Set SW1 pir	n 1 for					SW3 & SW4 -	AxisID Selec		
	10	+5V	0	5V supply for all feedback	sensors.			SW4	Pin 1	SW Pin 2	/3 Pin 3 Pin 4	Drive #1	Drive AxisID	Drive #3
	11	EncB1+/EncB	31	Encoder 1 B+ / Clock+ diff.	input or single-ended	d input.		off	off	off	off off	1	2 Drive #2	3
		Clk1+/Clk1		Set SW1 pin 2 for different		and 1		off	off	off	off on	9	10	11
	12	EncA2+/EncA Dt2+/Dt2	⁴² I	Incr. encoder 2 A / Data+ input. Set SW1 pin 4 for dif		-ended		off	off	off	on off	17	18	19
	13	EncB1-/	1	Encoder 1 B- / Clock- diff	. input. Set SW1 pi	n 2 for		off	off	off	on on	25	26	27
	13	Clk1-		differential.				off	off	on	off off	33	34 42	35 43
	14	EncA2-/Dt2-	- 1	Incr. encoder 2 A- / Data - differential.	diff. input. Set SW1 p	n 4 for		off off	off off	on on	off on on off	41 49	42 50	<u>43</u> 51
				Incr. encoder 1 Z / Z+ diff.	input or single-ender	d input.		off	off	on	on on	57	58	59
	15	Z1+	ļ	Set SW1 pin 3 for different	ial.			off	on	off	off off	65	66	67
	16	EncB2+/EncE		Encoder 2 B+ / Clock+ diff.		d input.		off	on	off	off on	73	74	75
		Clk2+/Clk2		Set SW2 pin1 for differentia Incr. encoder 1 Z- diff.		3 for		off	on	off	on off	81	82	83
	17	Z1-	1	differential.	input. Get Gwir pin			off off	on	off	on on off off	89 97	90 98	91 99
	18	EncB2-/	I	Encoder 2 B- / Clock- dif	f. input. Set SW2 p	oin1 for		off	on	on on	off on	105	106	107
		Clk2-	· ·	differential. Ground return.				off	on	on	on off	113	114	115
	19	GND	-	Ground return. Positive terminal of the log	ic supply input: 6 to /	48 Vpc		off	on	on	on on	121	122	123
	20	+Vlog	I	Internally connected to oth	er +Vlog pins.			on	off	off	off off	129	130	131
	<u> </u>			7				on	off	off	off on	137 145	138	139 147
	r			J				on	off off	off off	on off on on	145	146 154	147
	Pin		ype Rec	Descript	tion			on	off	on	off off	161	162	163
	2	Rsvd GND		erved. Do not connect. und return. Internally connec	ted to other GND nin	IS.		on	off	on	off on	169	170	171
			Por	itive terminal of the logic s				on	off	on	on off	177	178	179
	3		Inte	rnally connected to other +Vi				on	off	on	on on	185	186	187
	4	PE	- Eart	th connection				on	on	off	off off	193 201	194 202	195 203
			_]	<mark>6#x, J8, J</mark>	9			on	on	off off	off on on off	201	202	203
								on	on	off	on on	209	210	219
	Po		e Ty	ype Des	cription			on	on	on	off off	225	226	227
	JE			EtherCAT standard RJ4				on	on	on	off on	233	234	235
	J9			O EtherCAT standard RJ4				on	on	on	on off	241	242	243
		¢x USΒ		/O Standard Micro USB for	ro data transfer			on	on	on	on on	249	250	251

• Where "x" is 1, 2 or 3 for Micro 4804 SY3-CAT STO (P020.203.E403)

3.3.7 Pinouts for Micro 4804 SX4-CAN-STO Multi Axis System

Description Positive terminal of the motor supply: 7 to 48 V_{DC} . Internally connected to all drives +V_{mot} pins.

Ground return. Internally connected to other GND pins.

Description Phase A for 3-ph motors, A+ for 2-ph steppers,

Description

Ground return. Internally connected to other GND pins

Digital Hall, or Linear Hall sensor 3. Encoder 1 A+ / Data+ diff. input or single-ended input Set SW1 pin 1 for differential.

Ground return. Encoder 1 A-/Data- diff. input. Set SW1 pin 1 fo

SV supply for all feedback sensors. Encoder 1 B+ / Clock+ diff. input or single-ended input Set SW1 pin 2 for differential.

Incr. encoder 2 A / Data - diff. input. Set SW1 pin 4 for

differential. Incr. encoder 1 Z / Z+ diff. input or single-ended input

Set SW1 pin 3 for differential. Encoder 2 B+/ Clock+ diff. input or single-ended input. Set SW2 pin1 for differential. Incr. encoder 1 Z- diff. input. Set SW1 pin 3 for

differential. Encoder 2 B- / Clock- diff. input. Set SW2 pin1 for differential.

Ground return. Positive terminal of the logic supply input: 6 to 48 Vpc. Internally connected to other +Vieg pins.

Description

Positive terminal of the logic supply input: 6 to 48 V_{DC} . Internally connected to other +Vlog pins.

Ground return. Internally connected to other GND pins

Incr. encoder 2 A / Data+ diff. input or single-ended input. Set SW1 pin 4 for differential. Encoder 1 B- / Clock- diff. input. Set SW1 pin 2 for

J2#x

Phase B for 3-ph motors, A- for 2-ph steppers, Motor- for DC brush motors

Chopping resistor / Phase B- for 2-ph steppers

Digital Hall, or Linear Hall sensor 1.
 5V supply for all feedback sensors.

Digital Hall, or Linear Hall sensor 2. 5V supply for all feedback sensors.

O Phase C for 3-ph motors, B+ for 2-ph steppers

Earth connection for motor cable shielding **J3#x**

			$\overline{\mathbb{O}}$				
		Micro 48 TECHNO CANopen	SOFT	AN-STO N			ec ec
J2#1 1 J6# J6# J4#1	J3#1_ ;	J2#2 J6#: J4#2	13#2 [] 2]] J5#2	J2#3 1 	J3#3 1	J2#4 1 1 	<u>J3#4</u> <u>4</u> <u>J</u> J5#4
J2#1	3#1		13#2))				
			J	1			

Pin Name Type

Т

ο

ο

Name

GND Hall1

+5V Hall2 +5V

Hall3

EncA1+/EncA1 Dt1+/Dt1

GND

EncA1-/Dt1-

+5V

EncB1+/EncB1 Clk1+/Clk1

Dt2+/Dt2 EncB1-/

Clk1-

EncA2-/Dt2-

Z1+

EncB2+/EncB2 Clk2+/Clk2

Z1-

EncB2-

Clk2

GND

+Vlog

12 EncA2+/EncA2

Туре

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Type

1

differential.

differential.

J6#x

I/O Standard Micro USB for PC data transfer

Reserved. Do not cor

Earth connection

Earth connection.

Earth connection

Motor+ for DC brush motors

1,2,3 +Vmot

5,6,7 GND

Pin Name Type

A/A+

3 C/B+

4 PE

8 PE

1

2 B/A-

4 Cr/B-0

5 PE

Pin

3

5

6

7

8 9

10

11

13

14

15

16

17

18

19

20

Pin Name

2

3 +Vlog

4

USB

Rsvd GND 1

PE

		J4#x						
	Pin	Name	Туре	Description				
	1	232TX	0	RS-232 Data Transmission.				
	2	232RX	1	RS-232 Data Reception.				
	3	GND	-	Ground return.				
	4	+Vlog	I	Positive terminal of the logic supply input: 6 to 48 V _{DC} . Internally connected to other $+V_{log}$ pins.				
	5	IN2/LSP	-	5-48V digital NPN input. Positive limit switch input.				
	6	IN3/LSN	1	5-48V digital NPN input. Negative limit switch input.				
	7	I/O0	I/O	5-48V 1.5A NPN (sink) general-purpose digital programmable input IN0 or output OUT0				
	8	I/O1	I/O	5-48V 0.1A NPN (sink) general-purpose digital programmable input IN1 or output OUT1				
\leq	9	I/O4	I/O	5-48V 0.1A NPN (sink) general-purpose digital programmable input IN4 or output OUT4				
	10	IN5/Enable	1	5-48V digital NPN input. Drive Enable input.				
	11	GND	-	Ground return. Internally connected to other GND pins.				
	12	Analogin	I	Analog input (range software selectable 0-5V or ±10V)				
	13	+5V	0	Supply for all feedback sensors.				



Pin	Name	Туре	Description
1	STO2-	I	Safe Torque Off input 2, negative return (opto- isolated, 0V) DC from SELV/ PELV power
2	STO2+	I	Safe Torque Off input 2, supply for motor PWM output positive input (opto- operation
3	- PE	-	Earth connection
5	STO1+	I	Safe Torque Off input 1, positive input (opto- STO2+ and STO1-, STO2- 24V isolated, 18+40V) DC from SELV/ PELV power
6	STO1-	I	Safe Torque Off input 1, negative return (opto- isolated, 0V)

J8. **J9**

Pin	Name	Туре	Description
1	GND	-	Ground return.
2	Can Lo	I/O	CAN-Bus negative line (dominant low)
3	Can Hi	1/0	CAN-Bus positive line (dominant high)



OW4# Established Desig

Position Description 1 ON = Connect an 120Ω resistor between EncA1//Dt1 an EncA1//EncA1//Dt1/H/Dt1 feedback pins. 2 ON = Connect an 120Ω resistor between EncA1//Dt1/ an EncB1//EncA1/Dt1/H/Dt1 feedback pins. 3 ON = Connect an 120Ω resistor between EncB1/Clk1- an EncB1//EncA1/Dt1/K1 feedback pins. 3 ON = Connect an 120Ω resistor between Z1- and Z1+ feedback pins. 4 EncA2+/EncA2/Dt2+/Dt2 feedback pins. 5W2#x - Feedback Resistors selection 1 1 ON = Connect an 120Ω resistor between EncB2/Clk2- an EncB2+/EncA2/Dt2+/Clk2 feedback pins. 5W5 - CAN Resistors selection 1 1 ON = Connect an 120Ω resistor between CAN HI and CAN Lo signals. 5W4 - Protocol selection 5 8W3 - AxisID selection 5 8W3 - AxisID selection 5 5W3 - Gff off off off off 1 2 3 4 off off off off off off 1 2 3 4 off off off off off off 1 2 3 4 off off off off off off 1 2 3 4 off off off off on 0 9 10 11 12 off off			Resistors	selectio	า				
I EncA1+/EncA1/Dt1+/Dt1 feedback pins. 2 ON = Connect an 120Ω resistor between EncB1/Clk1- an EncB1+/EncB1/Clk1+(K1 feedback pins. 3 ON = Connect an 120Ω resistor between Z1- and Z1+ feedback pins. 4 ON = Connect an 120Ω resistor between EncA2+/D12- an EncA2+/D12 feedback pins. 5 WZ#x - Feedback Resistors selection 1 ON = Connect an 120Ω resistor between EncA2+/D12- an EncA2+/EncA2/D12+/D12 feedback pins. 5 WZ#x - Feedback Resistors selection 1 ON = Connect an 120Ω resistor between EncB2/Clk2- an EncB2+/ElncB2/Clk2+/Clk2 feedback pins. 5 WZ#x - Feedback Resistors selection 1 ON = Connect an 120Ω resistor between CAN Hi and CAN Lo signals. 5 WZ# - Frotocol selection 1 ON = Connect an 120Ω resistor between CAN Hi and CAN Lo signals. 5 W3 - AxisID selection 1 OFF - CANOpen mode 0N - TMLCAN mode SW3 - AxisID selection 5 W3 - AxisID selection 1 Off off off off 1 2 3 0 off off off on off 17 18 19 20 0 off off off on off 17 2 <td< th=""><th>Position</th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></td<>	Position								
EncA1+/EncA1/Dt1+/Dt1 feedback pins. 2 ON = Connect an 120Ω resistor between EncB1/Clk1- an EncB1+/EncB1/Clk1+/Clk1 feedback pins. 3 ON = Connect an 120Ω resistor between Z1- and Z1+ feedback pins. 4 ON = Connect an 120Ω resistor between EncA2+/Dt2- an EncA2+/EncA2/Dt2+/Dt2 feedback pins. 5W2#x - Feedback Resistors selection 0N = Connect an 120Ω resistor between EncB2/Clk2- an EncB2+/EncB2/Clk2+/Clk2 feedback pins. 3W5 - CAN Resistors selection 1 ON = Connect an 120Ω resistor between CAN Hi and CAN Lo signals. 5W4 - Protocol selection 1 ON = Connect an 120Ω resistor between CAN Hi and CAN Lo signals. 5W4 - Protocol selection 1 OFF - CANOpen mode 0N - TMLCAN mode 5W3 - AxisID selection 9W3 - AxisID selection 1 OFF - CANOpen mode 0N - TMLCAN mode 5W3 - AxisID selection 9W1 off off off off 1 2 3 4 off off off off off 1 2 3 4 off off off off off off 1 2 3 4 off off off off off 1 2 3 4 off off on off off 33 34 35 36 off on off off off off 73 74 75 76 on off off off off off 0 78 99 100 </td <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>n EncA1-</td> <td>-/Dt1- ar</td>	1						n EncA1-	-/Dt1- ar	
2 EncB1+/EncB1/Clk1+/Clk1 feedback pins. 3 ON = Connect an 120Ω resistor between Z1- and Z1+ feedback pins. 4 ON = Connect an 120Ω resistor between Z1- and Z1+ feedback pins. SW2#x - Feedback Resistors selection 10N = Connect an 120Ω resistor between EncA2/Dl2- an EncB2/Clk2+/Clk2 feedback pins. SW5 - CAN Resistors selection 10N = Connect an 120Ω resistor between EncB2/Clk2- an EncB2+/EncB2/Clk2+/Clk2 feedback pins. SW5 - CAN Resistors selection 10N = Connect an 120Ω resistor between CAN Hi and CAN Lo signals. SW4 - Protocol selection 9N = Connect an 120Ω resistor between CAN Hi and CAN Lo signals. SW4 - Protocol selection 9N = TMLCAN mode SW3 - AxisID selection 9N = TMLCAN mode SW3 - AxisID selection 910 11 12 off off off off off 1 2 3 4 910 11 12 off off off off on a ff 17 18 19 20 910 11 12 off off on off off 33 34 35 36 36 off on off off off an 33 34 35 36 36 off on off off off an 57 58 59 60 51 52 off on off off off an 73 74 75 76 68 on off off on off off 81 82 83 84 84 on off on off off an 89 90 9192 99 100 on off on off off 97 98 99 100									
SW2 Drive Aris 0 M = Connect an 120Ω resistor between Z1- and Z1+ feedback pins. 4 ON = Connect an 120Ω resistor between Z1- and Z1+ feedback pins. SW2#x - Feedback pictsiors selection 1 0 N = Connect an 120Ω resistor between Z1- and Z1+ feedback pictsors selection 1 0 N = Connect an 120Ω resistor between EncB2/CIk2- and EncB2+//EncB2/CIk2+/CIk2 feedback picts. 1 0 N = Connect an 120Ω resistor between CAN Hi and CAN Lo signals. SW3 - CAN Resistors selection 1 ON = Connect an 120Ω resistor between CAN Hi and CAN Lo signals. SW3 - CAN Resistors selection 1 0 FF - CANOpen mode 1 0 FF - CANOpen mode 1 0 FF - CANOpen mode 1 0 ff off off off 1 2 3 0 ff off off on off 17 18 19 20 0 ff off on off off on and 17 18 19 20 0 ff off on off off on and 17 18 19 20 0 ff on off off on and 57 58 59 60 0 ff on off off on and 57 58 59 60 0 ff on on off off 81 82 84	2						n EncB1/	Clk1- ar	
ON = Connect an 120Ω resistor between EncA2/D12- an EncA2/D2+/D12 feedback pins. SW2#x - Feedback Resistors selection									
4 EncA2+/EncA2/Dt2+/Dt2 feedback pins. SW2#x - Feedback Resistors selection 1 ON = Connect an 120Ω resistor between EncB2/Clk2+ an EncB2+/EncB2/Clk2+/Clk2 feedback pins. SW5 - CAN Resistors selection 1 ON = Connect an 120Ω resistor between CAN Hi and CAN Lo signals. SW3 - ArxisID selection 1 OFF - CANOpen mode 0N - TMLCAN mode SW3 - AxisID selection SW3 - AxisID selection SW3 Drive AxisID selection ON - TMLCAN mode SW3 Drive AxisID selection ON - TMLCAN mode ON - TMLCAN mode ON - TMLCAN mode ONT MLCAN mode ONT MLCAN mode	3								
EncA2/1/EncA2/D/27/D/27 teedback pins. SW2#x - Feedback Resistors selection 1 ON = Connect an 120Ω resistor between EncB2/Clk2- an EncB2/ElcB2/Clk2+/Clk2 feedback pins. SW5 - CAN Resistors selection 1 1 ON = Connect an 120Ω resistor between CAN Hi and CAN Lo signals. SW5 - CAN Resistors selection 1 0N = Connect an 120Ω resistor between CAN Hi and CAN Lo signals. SW4 - Protocol selection 5 0N - TMLCAN mode SW3 Drive AxisID Fin 1 Pin 2 Pin 3 9 10 11 12 0ff off off 1 2 3 4 off off off off 1 1 12 off off off off 1 1 12 off off off off 1 1 12 off off off off 11 12 3 off off off off 11 12 3	4						n EncA2-	-/Dt2- ar	
ON = Connect n 120Ω resistor between EncB2/CIk2- and	-								
I EncB2+/EncB2/Clk2+/Clk2 feedback pins. SW5 - CAN Resistors selection 1 ON = Connect an 120Ω resistor between CAN Hi and CAN Lo signals. SW4 - Protocol selection 0FF - CANOpen mode - 1 OFF - CANOpen mode - ON - TMLCAN mode - - SW3 - AxisID selection - - off off off 1 2 3 4 off <off< td=""> off off 0 1 1 2 3 4 off<off<off<on< td=""> 0 1 1 2 3 4 off<off<on< td=""> off<off<on< td=""> 1 1 3 34 35 36 off<on< td=""> off<on< td=""> off<on< td=""> 0 1 42 43 44 off<on< td=""> off<on< td=""> 73 74 75 76 6 66 6</on<></on<></on<></on<></on<></off<on<></off<on<></off<off<on<></off<>	SW2#x – F								
EncB2/EncB2/CIR2+/CIR2 feedback pins. SW5 - CAN Resistors selection 1 ON = Connect an 120Ω resistor between CAN Hi and CAN Lo signals. SW4 - Protocol selection 0FF - CANOpen mode 1 OFF - CANOpen mode SW3 - AxisID selection 0FF - CANOpen mode SW3 - AxisID selection 0FF - CANOpen mode SW3 - AxisID selection 0FF - CANOpen mode SW3 - CAN Reset 0FI - MILCAN mode SW3 - S	1						n EncB2/	Clk2- ar	
ON = Connect an 120Ω resistor between CAN Hi and CAN Lo signals. SW3 - Protocol selection OFF - CANOpen mode SW3 - AxisID selection SW3 - AxisID selection SW3 - Drive #X brive #X OFF - CANOpen mode SW3 - Drive #X Origon - TMLCAN mode SW3 - Drive #X Origon - AxisID Origon - AxisID off off off off 1 2 3 3 4 off off on on off 17 18 19 20 off off on on off off 33 34 35 36 off on off off 49 50 51 52 off on on off off 49 50 51 52 off on on on off off 65 66 67 68 on off off on off f 81 82 83 84 off on off off f 97 98 99 100 on off off off of f off on off off f off on off off off f off on off off f <th col<="" td=""><td></td><td></td><td></td><td></td><td>feedback pi</td><td>ns.</td><td></td><td></td></th>	<td></td> <td></td> <td></td> <td></td> <td>feedback pi</td> <td>ns.</td> <td></td> <td></td>					feedback pi	ns.		
SW4 - Protocol selection OFF - CANOpen mode 1 OFF - CANOpen mode SW3 - AxisID selection SW3 SW3 - AxisID selection SW3 off off off off Drive #1 Drive #2 Drive #3 Drive #4 off off off off off 1 2 3 4 off off off off 1 1 2 3 4 off off off off 1 1 2 3 4 off off off off 1 1 2 3 4 off off on off 1 1 2 3 4 off on off on 2 2 2 2 2 2 2 2 2 3 3 3 3 3 3 3 3 3 3 3 3 4									
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ON - TMLCAN mode SW3 - Drive AxisID SW3 Drive #1 Drive #2 Drive #3 Drive #4 off off off off 1 2 3 4 off off off off 1 2 3 4 off off off off 1 2 3 4 off off off off 17 18 19 20 off off on on 25 26 27 28 off on off off 33 34 35 36 off on off off on 41 42 43 44 off on on off 65 66 67 68 onf on on off off on 76 68 on off on off off on	SW4 – Pro								
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	on	on	on	on	121	122	123	124	

•	Where "x" is 1,	2, 3 or 4 for Micro	4804 SX4-CAN-STO	(P020.103.E404)
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Pinouts for Micro 4804 SX3-CAN-STO Multi Axis System 3.3.8

г			J1	J9 CAN
				<u> </u>
$\left \right $			J7 [] [] []	Micro 4804 SX3-CAN-STO Multi Axis System
		J6#1		
			J5#1 #1 ·····\	J4#2 J5#2 J4#3 J5#3 Reserved Reserved
		WI Ut	י זווע	<u>J1</u>
	Pir	n Name	Туре	Description
	1,2,	3 +Vmot	I	Positive terminal of the motor supply: 7 to 48 V_{DC} . Internally connected to all drives +V_{mot} pins.
	4	PE	-	Earth connection.
	5,6,		-	Ground return. Internally connected to other GND pins.
	8	PE	-	Earth connection

J2#x

Phase A for 3-ph motors, A+ for 2-ph steppers, Motor+ for DC brush motors
 Phase B for 3-ph motors, A- for 2-ph steppers, Motor- for DC brush motors

O Phase C for 3-ph motors, B+ for 2-ph steppers

Earth connection for motor cable shielding 3#x

Chopping resistor / Phase B- for 2-ph steppers

Description

Pin Name Type

1 A/A+ 2 B/A-3 C/B+

4 Cr/B-0

5 PE

				J4#x
	Pin	Name	Туре	Description
	1	232TX	0	RS-232 Data Transmission
	2	232RX	-	RS-232 Data Reception.
	3	GND	-	Ground return.
	4	+Vlog	I	Positive terminal of the logic supply input: 6 to 48 V _{DC} . Internally connected to other $+V_{log}$ pins.
	5	IN2/LSP	-	5-48V digital NPN input. Positive limit switch input.
	6	IN3/LSN	1	5-48V digital NPN input. Negative limit switch input.
	7	I/O0	I/O	5-48V 1.5A NPN (sink) general-purpose digital programmable input IN0 or output OUT0
	8	I/O1	I/O	5-48V 0.1A NPN (sink) general-purpose digital programmable input IN1 or output OUT1
\leq	9	I/O4	I/O	5-48V 0.1A NPN (sink) general-purpose digital programmable input IN4 or output OUT4
	10	IN5/Enable	1	5-48V digital NPN input. Drive Enable input.
	11	GND	-	Ground return. Internally connected to other GND pins.
	12	Analogin		Analog input (range software selectable 0-5V or ±10V)
	13	+5V	0	Supply for all feedback sensors.



_				
	Pin	Name	Туре	Description
	1	STO2-	I	Safe Torque Off input 2, negative return (opto-STO2+ and STO1-, STO2- 24V isolated, 0V)
	2	STO2+	I	Safe Torque Off input 2, Supply for motor PWM output isolated, 18+40V) operation
	3 4	PE	-	Earth connection
	5	STO1+	I	Safe Torque Off input 1, Apply between both STO1+, positive input (opto-STO2+ and STO1-, STO2- 24V isolated, 18+40V)
	6	STO1-	I	Safe Torque Off input 1, supply for motor PWM output isolated, 0V)

J8. J9

Pin	Name	Туре	Description
1	GND	-	Ground return.
2	Can Lo	I/O	CAN-Bus negative line (dominant low)
3	Can Hi	/0	CAN-Bus positive line (dominant high)



SW1#x - Feedback Resistors selection Position Description 1 ON = Connect an 120Ω resistor between EncA1-/Dt1- an EncA1+/EncA1/Dt1+/Dt1 feedback pins. 2 ON = Connect an 120Ω resistor between EncA1-/Dt1- an EncB1+/EncA1/Dt1+/Dt1 feedback pins. 3 ON = Connect an 120Ω resistor between EncB1/Clk1+ an EncB1+/EncB1/Clk1+/Clk1 feedback pins. 3 ON = Connect an 120Ω resistor between EncB2/Dt2- an EncA2+/EncA2/Dt2+/Dt2 feedback pins. SW2#x - Feedback Resistors selection SW2#x - Feedback Resistors selection 1 ON = Connect an 120Ω resistor between EncB2/Clk2- an EncB2+/EncB2/Clk2+/Clk2 feedback pins. SW5 - CAN Resistors selection TON = Connect an 120Ω resistor between CAN Hi and CAN Lo signals SW4 - Protocol selection Torve AxisID 1 ON = Connect an 120Ω resistor between CAN Hi and CAN Lo signals SW4 - Protocol selection Drive AxisID 6W3 - AxisID selection Drive #X3 6W3 - AxisID selection Drive 4XisID 9 off off off off off 1 2 3 off off off off off 33 34 35 off off off off off A1 2 3 off off off off off 65 66 67	SW1#v _ E	adhack	Posistore	selection	<u> </u>			
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			UUITA		
Pin	Name	Туре	Description		
1	GND	-	Ground return. Internally connected to other GND pins		
2	Hall1	1	Digital Hall, or Linear Hall sensor 1.		
3	+5V	0	5V supply for all feedback sensors.		
4	Hall2	<u> </u>	Digital Hall, or Linear Hall sensor 2.		
5	+5V	0	5V supply for all feedback sensors.		
6	Hall3		Digital Hall, or Linear Hall sensor 3.		
7	EncA1+/EncA1 Dt1+/Dt1	I	Encoder 1 A+ / Data+ diff. input or single-ended input Set SW1 pin 1 for differential.		
8	GND	-	Ground return.		
9	EncA1-/Dt1-	I	Encoder 1 A-/Data- diff. input. Set SW1 pin 1 fo differential.		
10	+5V	0	5V supply for all feedback sensors.		
11	EncB1+/EncB1 Clk1+/Clk1	I	Encoder 1 B+ / Clock+ diff. input or single-ended input Set SW1 pin 2 for differential.		
12	EncA2+/EncA2 Dt2+/Dt2	I	Incr. encoder 2 A / Data+ diff. input or single-ended input. Set SW1 pin 4 for differential.		
13	EncB1-/ Clk1-	I	Encoder 1 B- / Clock- diff. input. Set SW1 pin 2 fo differential.		
14	EncA2-/Dt2-	I	Incr. encoder 2 A- / Data - diff. input. Set SW1 pin 4 fo differential.		
15	Z1+	I	Incr. encoder 1 Z / Z+ diff. input or single-ended input Set SW1 pin 3 for differential.		
16	EncB2+/EncB2 Clk2+/Clk2	I/O	Encoder 2 B+ / Clock+ diff. input or single-ended input Set SW2 pin1 for differential.		
17	Z1-	I	Incr. encoder 1 Z- diff. input. Set SW1 pin 3 fo differential.		
18	EncB2-/ Clk2-	I	Encoder 2 B- / Clock- diff. input. Set SW2 pin1 fo differential.		
19	GND	-	Ground return.		
20	+Vlog	I	Positive terminal of the logic supply input: 6 to 48 V _{DC} Internally connected to other $+V_{log}$ pins.		
	J6#x				
U	SB I/O S	tandar	d Micro USB for PC data transfer		

	J7					
Pin	Name	Туре	Description			
1	Rsvd	-	Reserved. Do not connect.			
2	GND	-	Ground return. Internally connected to other GND pins.			
3	+Vlog	I	Positive terminal of the logic supply input: 6 to 48 V_{DC} . Internally connected to other +V _{log} pins.			
4	DE	-	Earth connection			

Where "x" is 1, 2, or 3 for Micro 4804 SX3-CAN-STO (P020.103.E403)

3.4 Mechanical Mounting

The *Micro 4804 Multi Axis System* 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 are:

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

3.4.1 Cable sets

To simplify the evaluation of the Micro 4804 Multi-Axis System, a complete cable set is available. Please refer to the following part numbers when placing orders:

Part Number	Description
P038.020.C020	CCS Micro 4804 SY4-CAT (Complete cable set 100 cm)
P038.020.C021	CCS Micro 4804 SX4-CAN (Complete cable set 100 cm)
P038.021.C022	CCS Micro 4804 SY4-CAT-STO (Complete cable set 100 cm)
P038.021.C023	CCS Micro 4804 SX4-CAN-STO (Complete cable set 100 cm)

3.5 Mating Connectors for Micro 4804 Multi-Axis System

Image	Connector		Description	Manufacturer	Part Number	Image
3	J1		acle Housing, TPA Capable, 2.50mm 8 Circuits, Black, Glow-Wire Capable	Molex	1053081208	A STATE
	J2#x	1x5 Nano-Fit, 2.5 Housing, 5 circui	00mm Pitch Nano-Fit Wire-to-Board ts	Molex	1053071205	and the second
727	J3#x	2x10 Pico-Clasp, Board Housing, 2	1.00mm Pitch Pico-Clasp Wire-to- 20 Circuits	Molex	5011892010	TAN
HERE BELLEVILLE	J4#x	Board Housing, 1		Molex	5013301300	
	J7, J8 ¹ , J9 ¹	1x3 Nano-Fit, 2.5 Housing, 3 circuit	50mm Pitch Nano-Fit Wire-to-Board ts	Molex	1053071203	
SAC	J6#x		e USB A Male - Micro B Male, 1m, 9.6mm plastic width	Tensility International Corp	1002333	
	J1, J7, J8 ¹ , J9 ¹ , J2#x	Pre-Crimped wires for Nano-Fit	Cable Assembly, Nano-Fit Crimp Terminal Socket to Nano-Fit Crimp Terminal Socket, 300mm	Molex	0797582140	
	J3#x, J4#x, J5#x²	Pre-Crimped wires for Pico- Clasp	Cable Assembly, Pico-Clasp Crimp Terminal Socket to Pico-Clasp Crimp Terminal Socket, 300mm	Molex	0797581019	Contraction of the second
and the second	J1, J7, J8 ¹ , J9 ¹ , J2#x	Pins for Nano- Fit	Nano-Fit Crimp Terminal, Female, 0.76µm Gold (Au) Plating, Lubricated, 24-26 AWG	Molex	1053001400	A A A A A A A A A A A A A A A A A A A
	J3#x, J4#x, J5#x ²	Pins for Pico-Clasp	1.00mm Pitch, Pico-Clasp Female Crimp Terminal, Gold Plating 0.10µm, 28-32 AWG, Reel	Molex	5011937000	A A A A A A A A A A A A A A A A A A A
	J3#x, J4#x, J5#x²	Crimp tool Pico-Clasp	Crimp Tool, Ratchet, Molex Pico- Clasp 501193 & 501334 Series 32- 28AWG Contacts	Molex	638191500	
	J1, J7, J8 ¹ , J9 ¹ , J2#x		Crimp Tool, Ratchet, Molex Nano- Fit 105300 Series 26-24AWG Socket Contacts, 207129 Series	Molex	638276000	
	J5#x²	1x6 Pico-Clasp Board Housing,	o, 1.00mm Pitch Pico-Clasp Wire-to- 6 Circuits	Molex	5013300600	

• Where "x" can be:

o 1, 2, 3 or 4 for P020.102.E404, P020.202.E404, P020.103.E404 and P020.203.E404

o 1, 2, or 3 for P020.102.E403, P020.202.E403, P020.103.E403 and P020.203.E403

¹ Only for the Micro 4804 SX Multi Axis System

² Only needed for the STO executions: P020.103.E404, P020.103.E403, P020.203.E404 and P020.203.E403

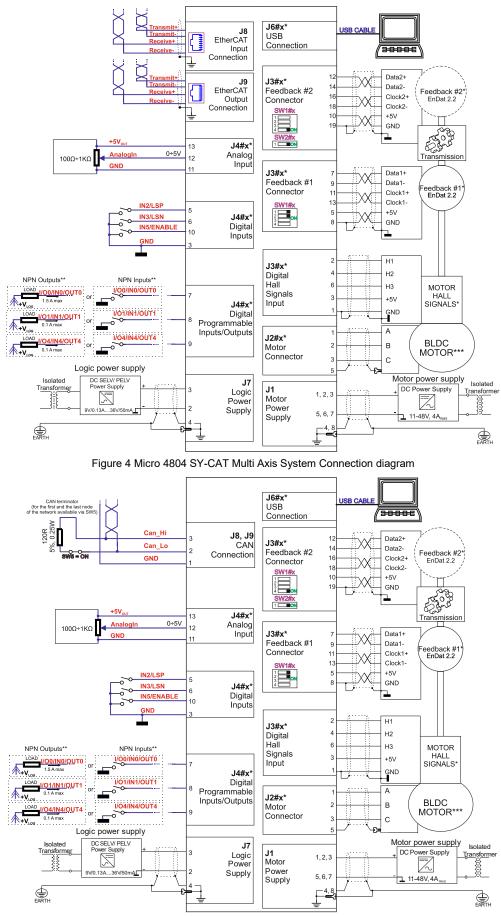


Figure 5 Micro 4804 SX-CAN Multi Axis System Connection diagram

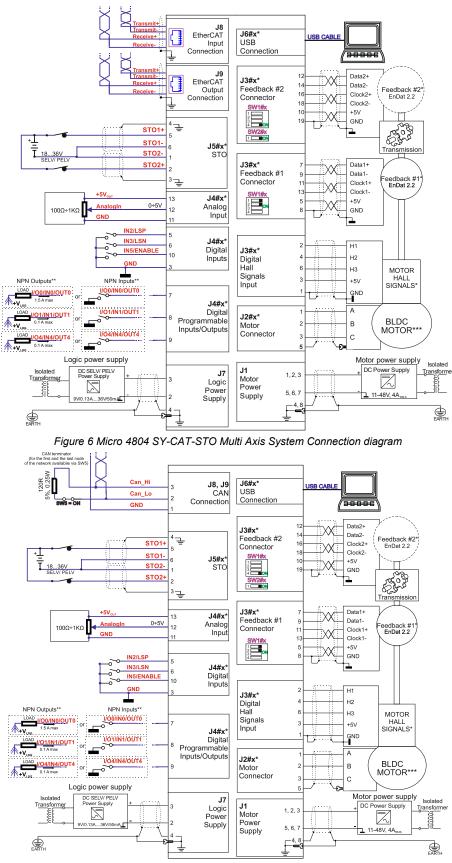


Figure 7 Micro 4804 SX-CAN-STO Multi Axis System Connection diagram

* Where "x" can be:

- o 1, 2, 3 or 4 for P020.102.E404, P020.202.E404, P020.103.E404 and P020.203.E404
- o 1, 2, or 3 for P020.102.E403, P020.202.E403, P020.103.E403 and P020.203.E403
- ** For other available feedback / motor options, check the detailed diagrams below
- *** Pins are software selectable individually as NPN inputs/outputs

3.7.1 NPN inputs

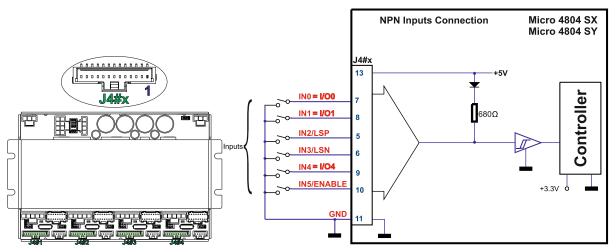


Figure 8 Digital NPN Inputs connection

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 individually software selectable as either NPN inputs or outputs.
- 3. The length of the cables must be up to 30m, reducing the exposure to voltage surges in industrial environment.

3.7.2 NPN outputs

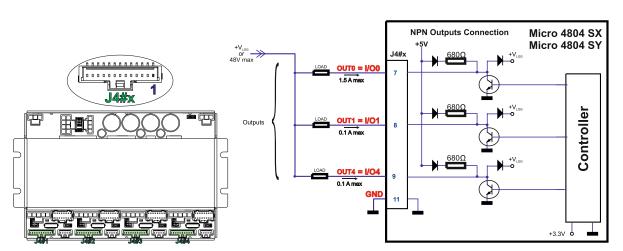


Figure 9 Digital NPN Outputs connection

Remarks:

- 1. 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 individually software selectable as either NPN inputs or outputs.

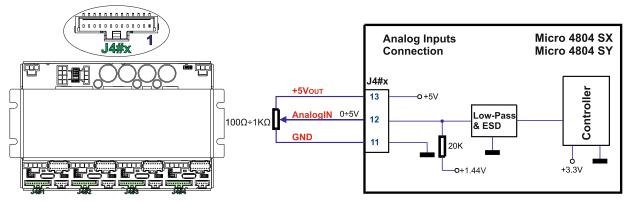


Figure 10 0-5V Analog inputs connection

Remarks:

3.8.1

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

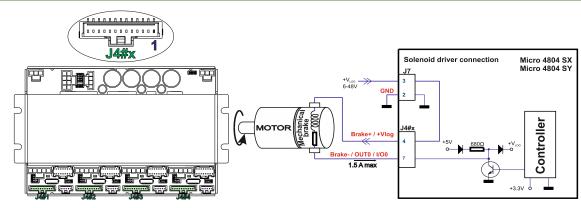


Figure 11 Solenoid driver connection

Remarks:

- 1. The firmware can control the Brake- output automatically to engage/disengage a mechanical brake when motor control is started/stopped.
- The Brake- pin can also be used as the NPN digital output OUT0. 2.

Solenoid driver connection for motor brake

To enable the mechanical brake functionality select the following checkbox from EasyMotion Studio II: 3.

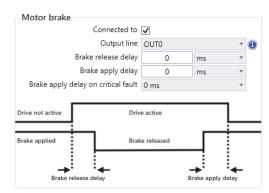


Figure 12 Motor brake checkbox in EasyMotion Studio II

1.

- 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, outof-phase) output remains unconnected.

3.9 Motor connections

3.9.1 Brushless Motor connection

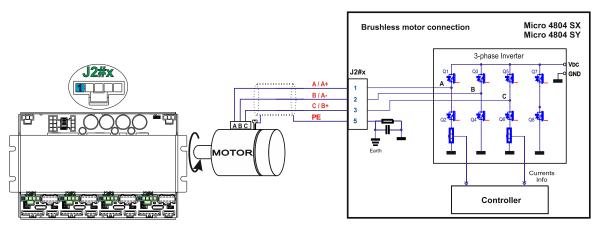


Figure 13 Brushless motor connection

3.9.2 DC Motor connection

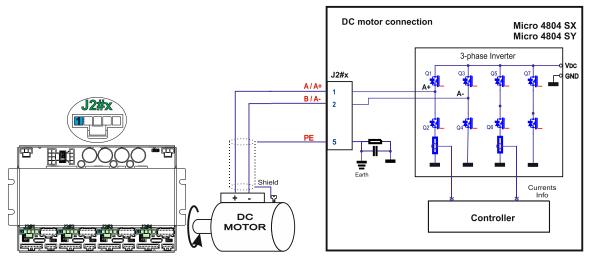


Figure 14 DC Motor connection

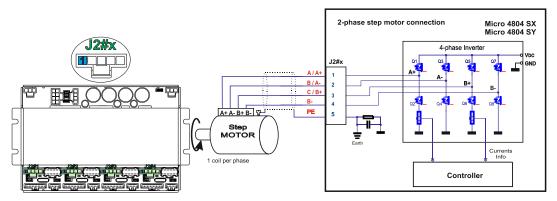


Figure 15. 2-phase step motor connection, one coil per phase

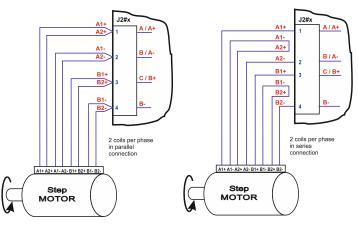


Figure 16. 2-phase step motor connection, two coils per phase

3.9.4 3-Phase Step Motor connection

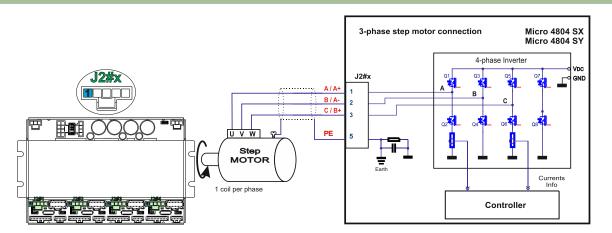
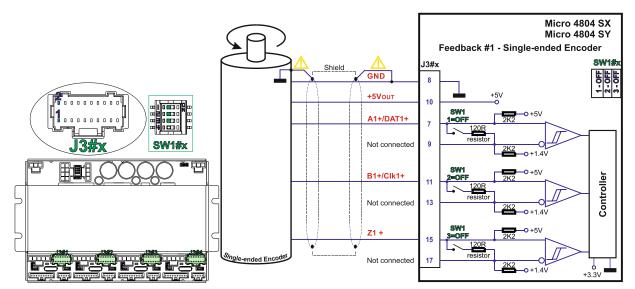


Figure 17. 3-phase step motor connection

3.9.4.1 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.
- 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 4804 Multi Axis System 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.
- d) The shield must be connected to PE (protective earth) J2#x pin 5 and it is recommended to be also connected to the motor chassis.



3.10.1 Feedback #1 - Single-ended Incremental Encoder Connection





DO NOT CONNECT UNTERMINATED WIRES TO PINS J3#x.9, J3#x.13 AND J3#x.17. THEY MIGHT PICK UP UNWANTED NOISE AND GIVE FALSE ENCODER CAUTION! READINGS. Encoder cable shield must be connected to system GND to avoid disturbances /

noise induced by nearby cables.

3.10.2 Feedback #1 - Differential Incremental Encoder Connection

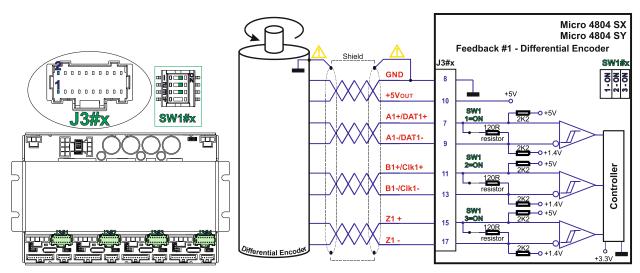


Figure 19 Feedback #1 - Differential Incremental Encoder Connection

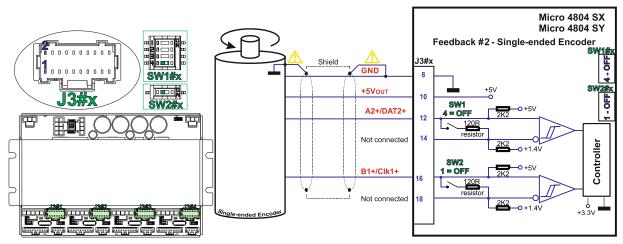
Remarks:

- 1. For Micro 4804 Multi Axis System Feedback #1 differential connection, 120Ω (0.25W) termination resistors are internally added by putting the SW1#x switches 1,2 and 3 on "ON" position.
- 2. 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.







CAUTION! DO NOT CONNECT UNTERMINATED WIRES TO PINS J3#x.14 AND J3#x.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.

3.10.4 Feedback #2 - Differential Incremental Encoder Connection

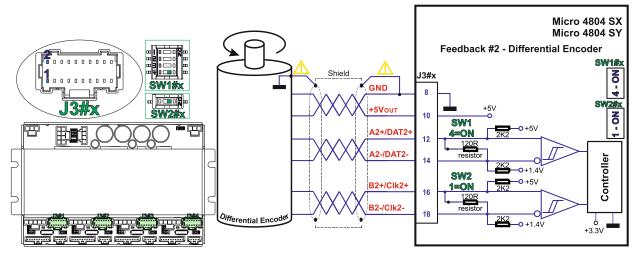


Figure 21 Feedback #2 - Differential Incremental Encoder Connection

Remarks:

- 1. For Micro 4804 Multi Axis System Feedback#2 differential connection, termination resistors are internally added by putting the SW1#x switch 4 and SW2#x switch 1 on "ON" position.
- 2. 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.

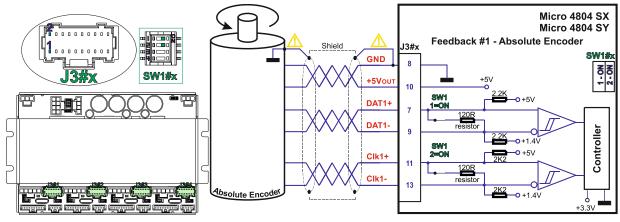


Figure 22 Feedback #1 – Absolute Encoder Connection

Remarks:

- 1. For Micro 4804 Multi Axis system Feedback#1 absolute connection, 120Ω (0.25W) termination resistors are internally added by putting the SW1#x switches 1 and 2 on "ON" position.
- 2. 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.

3.10.6 Feedback #1 – Absolute Encoder Connection: Panasonic, Tamagawa, Nikon, Sanyo Denki

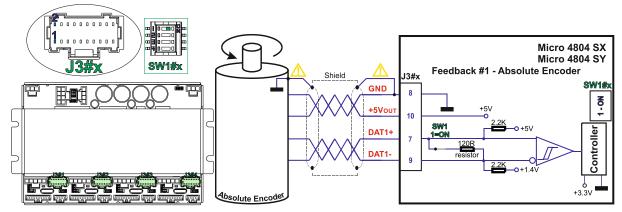


Figure 23 Feedback #1 – Absolute Encoder Connection

Remarks:

- 1. For Micro 4804 Multi Axis system Feedback#1 absolute connection, 120Ω (0.25W) termination resistors are internally added by putting the SW1#x switch 1 on "ON" position.
- 2. 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.

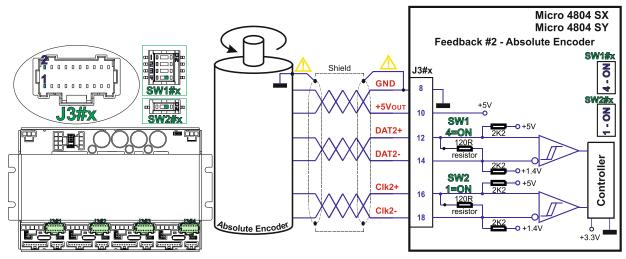


Figure 24 Feedback #2 – Absolute Encoder Connection

Remarks:

- 1. For Micro 4804 Multi Axis System Feedback#2 absolute connection for SSI, BiSS and EnDAT, termination resistors are internally added by putting the SW1#x position 4 and SW2#x position 1 on "ON" position.
- 2. 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.

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

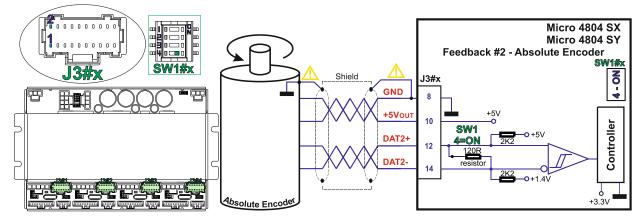


Figure 25 Feedback #2 – Absolute Encoder Connection

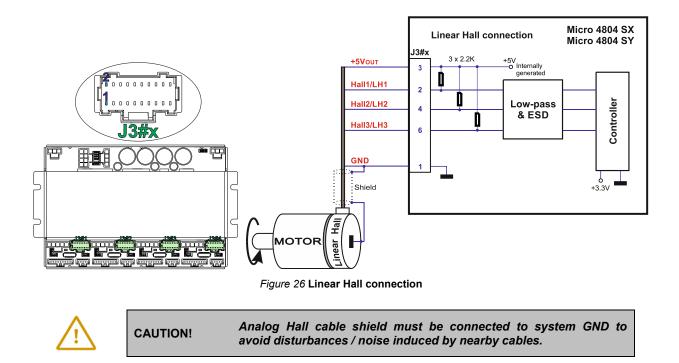
Remarks:

- 1. For Micro 4804 Multi Axis System Feedback#2 absolute connection for Panasonic, Tamagawa, Nikon and Sanyo Denki, termination resistors are internally added by putting the SW1#x position 4 on "ON" position.
- 2. 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.



3.10.10 Digital Hall Connection for Motor + Hall + Incremental Encoder

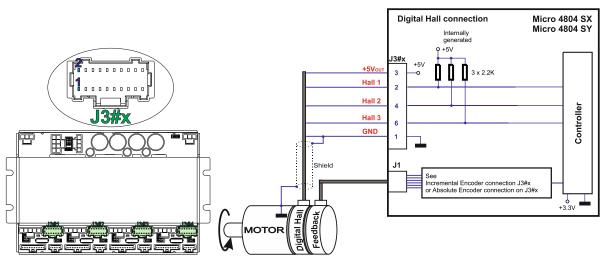


Figure 27 Digital Hall connection

Remarks:

- 1. 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.
- 2. The Micro 4804 are equipped with a feature that detects breakage of Hall wires and/or of incremental/absolute encoder wires.¹
- 3. 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.

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

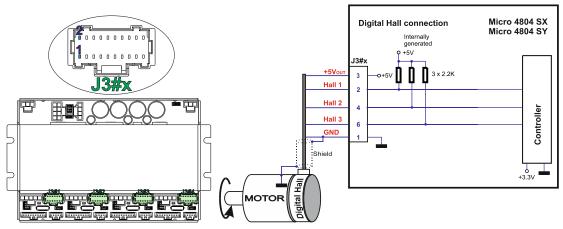


Figure 28 Digital Hall connection

Remarks:

- 1. 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.
- 2. The Micro 4804 are equipped with a feature that detects breakage of Hall wires and/or of incremental/absolute encoder wires.¹
- 3. The length of the cables must be up to 30m, reducing the exposure to voltage surges in industrial environment.

disturbances / noise induced by nearby cables.

Digital Hall cable shield must be connected to system GND to avoid

3.10.11.1 General recommendations for feedback wiring

CAUTION!

- 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.
- d) Internally generated 5V supply has nominal voltage 5.2V, thus allowing longer and smaller (thinner) cabling for feedback devices supplied with 5V and requiring high current consumption, such that the voltage drop across wiring can be up to 0.1V (both on +5 and on GND) without affecting the feedback device supply quality

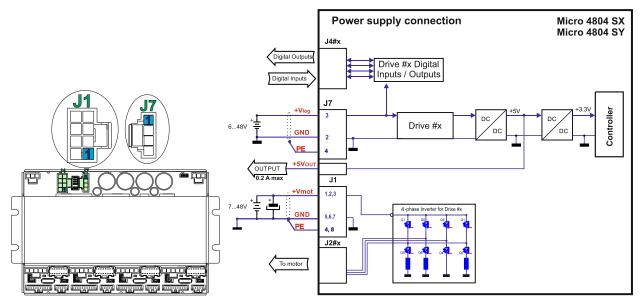


Figure 29 Supply connection for Micro 4804 SX / SY

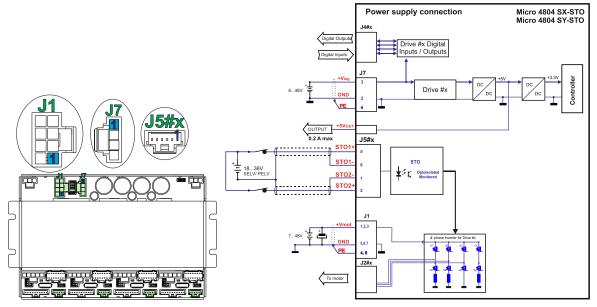


Figure 30 Supply connection for Micro 4804 SX / SY - STO

Remarks:

- The Micro 4804 requires two supply voltages: +V_{LOG} for logic power and +V_{MOT} for motor power. Additionally, a third supply voltage is needed for the STO circuit, applicable only to specific models - P020.103.E404, P020.103.E403, P020.203.E404, and P020.203.E403.
- The STO and +V_{LOG} inputs can share the same power source if the supply voltage ranges between 18 to 36V DC and is provided by a SELV/PELV power supply.
- 3. When the STO inputs are left unconnected, the motor outputs will be disabled. This provides a dual redundant hardware protection that cannot be overdriven by the software or other hardware components.
- 4. To enable PWM output, the STO circuit must receive a minimum of 18V.
- 5. The J7 connector is internally linked to all $+V_{LOG}$ inputs and GND across all axis.
- 6. An external electrolytic capacitor may be added between +V_{MOT} and GND, to help reduce over-voltage during load braking/ reversals. For more details, refer to paragraph 3.11.1.2.

- a) Use short, thick wires between the Micro 4804 and the motor power supply. Connect power supply wires to all the indicated pins.
- b) 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 4804.
- If the motor power supply cable is shielded, it must be connected to PE J1 pins 4, 8 and it is recommended c) to be also connected to the motor chassis. The logic power supply cable shield must be connected to GND at both ends.

3.11.1.2 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 have 2 options:

1. 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

UNOM 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:

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

where:

Kinetic energy

J_M – total rotor inertia [kgm²]

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

 ϖ_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]

h_{final} - final system altitude [m]

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

 R_{Ph} – motor phase resistance [Ω]

td - 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].

2. Connect a chopping resistor R_{CR} between phase CR / B- and ground, and activate the software option of dynamic braking (see below).

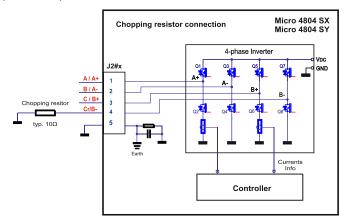


Figure 31. Chopping resistor connection

Remark: This option is not available when the drive is used with a step motor.

The chopping resistor option can be found in the Drive Setup dialogue within EasyMotion Studio II:

Active if power supply > 57 V * Is connected to BC90100 module V Via output line OUT0 *	External chopping resistor				
Is connected to BC90100 module 🗹 Via output line OUT0 🔹		Active if power supply >	57	V	*
	ls connected to BC90100 module ✔	Via output line	OUT0		*

The chopping will occur when DC bus voltage increases over UCHOP. This parameter (UCHOP) should be adjusted depending on the nominal motor supply. Optimally (from a braking point of view), UCHOP should be a few volts above the maximum nominal supply voltage. Take into consideration also the tolerance of the supply, such that UCHOP is a few volts above the maximum supply including tolerance. This setting will activate the chopping resistor earlier, before reaching dangerous voltages - when the over-voltage protection will stop the drive. Of course, U_{CHOP} must always be less than U_{MAX} – the over-voltage protection threshold.

Remark: This option can be combined with an external capacitor whose value is not enough to absorb the entire regenerative energy E_M but can help reducing the chopping resistor size.

The BC90100 module (P038.100.E201) is a brake chopper module compatible with all Technosoft Intelligent drives, supporting up to 160A. For more details, refer to the "BC90100 brake chopper module datasheet" (codified as P038.100.E201.DSH.xx).

2.1 Chopping resistor selection

The chopping resistor value must be chosen to respect the following conditions:

1. to limit the maximum current below the drive peak current IPEAK = 16A

$$R_{CR} > \frac{U_{MAX}}{I_{PEAK}}$$

2. to sustain the required braking power:

$$P_{CR} = \frac{E_M - \frac{1}{2}C(U_{MAX}^2 - U_{CHOP}^2)}{t_d}$$

where C is the capacitance on the motor supply (external), i.e.

$$R_{CR} < \frac{U_{CHOP}^2}{2 \times P_{CR}}$$

3. to limit the average current below the drive nominal current I_{NOM}=8A

$$R_{CR} > \frac{P_{CR} \times t_d}{t_{CYCLE} \times I_{NOM}^2}$$

where t_{CYCLE} is the time interval between 2 voltage increase cycles in case of repetitive moves.

4. to be rated for an average power
$$P_{AV} = \frac{P_{CR} \times t_d}{t_{CYCLE}}$$
 and a peak power $P_{PEAK} = \frac{U_{MAX}^2}{R_{CR}}$

Remarks:

1. If $\frac{U_{MAX}}{I_{PEAK}} > \frac{U_{CHOP}^2}{2 \times P_{CR}}$ the braking power P_{CR} must be reduced by increasing either t_d – the time to decelerate .

or C – the external capacitor on the motor supply

2. If $\frac{P_{CR} \times t_d}{t_{CYCLE} \times I_{NOM}^2} > \frac{U_{CHOP}^2}{2 \times P_{CR}}$ either the braking power must be reduced (see Remark 1) or t_{CYCLE} – the time interval between chopping cycles must be increased

WARNING! THE CHOPPING RESISTOR MAY HAVE HOT SURFACES DURING OPERATION.

3.12 USB connection

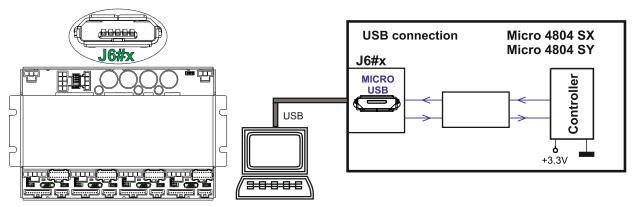


Figure 32 USB connection

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.

Remark:

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

3.13 Serial RS-232 connection

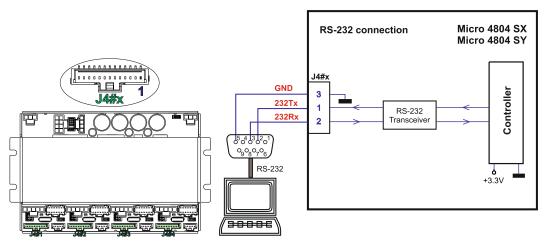


Figure 33. Serial RS-232 connection

Remark:

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

3.13.1.1 Recommendation for wiring

- a) 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.
- b) Always power-off all the Micro 4804 supplies before inserting/removing the RS-232 serial connector
- c) Do not rely on an earthed PC to provide the Micro 4804 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

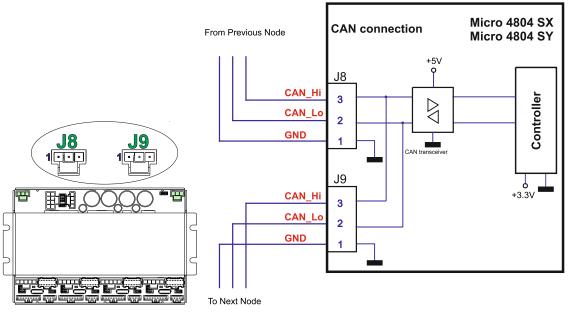


Figure 34. CAN connection

Remarks:

- 1. The CAN network requires a 120-Ohm terminator between CAN-Hi and CAN-Lo signals available via SW5.
- 2. CAN signals are not isolated from other Micro 4804 circuits.
- 3. EasyMotion Studio can communicate in parallel with RS232 communication while CAN communication is active

3.14.1.1 Recommendation for wiring

- a) 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.

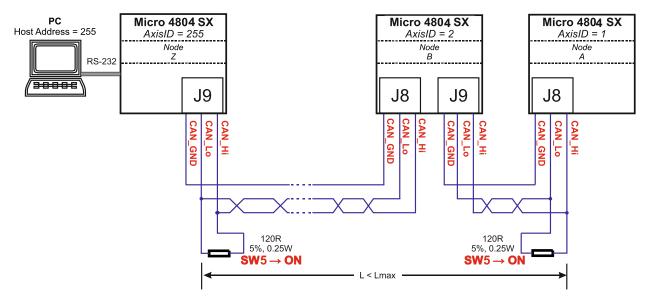


Figure 35. Multiple-Axis CAN network

3.15 EtherCAT Connection

3.15.1 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 recommended 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. More important, the added shielding improves susceptibility / immunity to external EMI, which otherwise can lead (in extreme cases) to packet loss.
- 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* 36 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* 37 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.

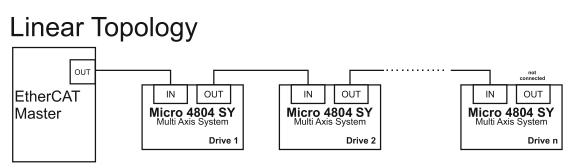


Figure 36 EtherCAT network linear topology

Ring Topology

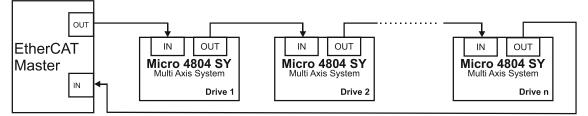


Figure 37 EtherCAT network ring topology

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.

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

3.16.1 Disabling Autorun (for SX system)

When an Micro 4804 SX4 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 via SW2. 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 (Figure **38**). 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.

3.16.2 Disabling the setup table at startup (for SY system)

In rare instances, the setup table may become corrupted, causing the drive to continuously reset. This condition is indicated by both the Ready and Error LEDs blinking rapidly in succession.

To recover from this state, invalidate the setup table by connecting all digital Hall inputs to GND. Upon the next poweron, the drive will load the default settings and set bit 2 in the Motion Error Register, indicating "Invalid Setup Data." Once a new valid setup table is loaded onto the drive, disconnect the Hall sensors from GND and perform another power cycle (power off and then on).

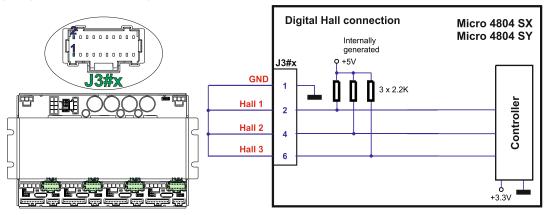


Figure 38 Temporary connection during power-on to invalidate the Setup table for Micro 4804

3.17 LED Indicators for Micro 4804 SY

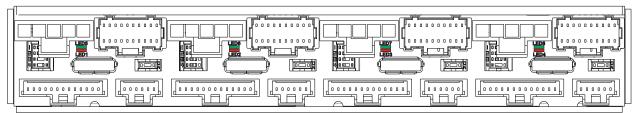


Figure 39 LED indicators

LED	LED name	LED color	Function
1, 2, 3, 4	EtherCAT® ERROR	red	EtherCAT® ERROR indicator.
5, 6, 7, 8	EtherCAT® RUN	green	EtherCAT® RUN indicator.

The RUN states are shown with a 180-degree phase shift relative to the ERROR states, as illustrated in Figure 40. STATUS indicator Example. The specific behavior of the RUN indicator is detailed in Table 1. RUN Indicator States, while the behavior of the ERROR indicator is outlined in Table 2. ERROR Indicator States.

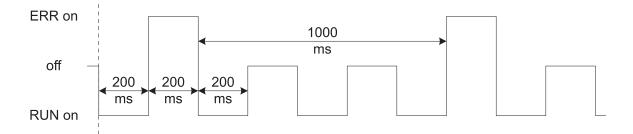


Figure 40. STATUS indicator Example

	Table 1. RUN Indicator States								
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 2. 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

3.18 Axis ID Selection

3.18.1 AxisID selection for Micro 4804 SX

The drive's AxisID value is configured after power-on by one of the following methods:

- Software, Using EasyMotion Studio II, set a specific AxisID value in the range of 1-255 within the AxisID settings under the setup section.
- Hardware, In EasyMotion Studio II, select the 'H/W' option under AxisID settings in the setup section, then set SW3 according Table 3.3 AxisID selection for Micro 4804 SX to _ system.

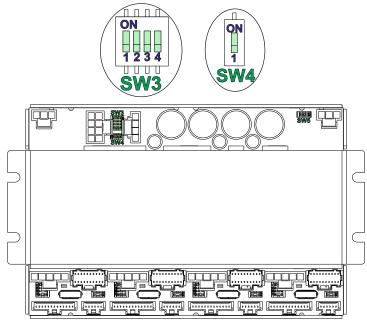


Figure 41 Axis ID switches for Micro 4804 SX

Table 3.3 – AxisID selection for Micro 4804 SX system

Position 1 Position 2 Position off off off off off off off off off off off off off off off on off off off on off on off off off on off off off on off off	n 3 Position 4 off on off on off off on	Drive #1 1 9 17 25 33	Drive #2 2 10 18 26 34	Drive #3 3 11 19 27 35	Drive #4* 4 12 20 28 36
off off off off off on off off on off on off off on off off on off	on off on off	17 25 33	10 18 26	11 19 27	12 20 28
off off on off off on off off on off off off on off off	off on off	17 25 33	18 26	19 27	20 28
off off on off on off off on off	on off	25 33	26	27	28
off on off off on off	off	33			
off on off			34	35	36
	on	11			
		41	42	43	44
off on on	off	49	50	51	52
off on on	on	57	58	59	60
on off off	off	65	66	67	68
on off off	on	73	74	75	76
on off on	off	81	82	83	84
on off on	on	89	90	91	92
on on off	off	97	98	99	100
on on off	on	105	106	107	108
on on on	off	113	114	115	116
on on on	on	121	122	123	124

- The communication protocol can be set by the SW4 switch: ٠
 - **ON = TMLCAN** mode is selected;
 - OFF = CANopen mode is selected.

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.
- The default Axis ID for all Micro 4804 SX is 255. If the CANOpen mode is selected and the AxisID value is 255, 2. drive will be in "LSS inactive" state.
- 3. All pins are sampled at power-up, and the drive is configured accordingly.

The Micro 4804 SY Multi Axis System 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's AxisID value is configured after power-on by one of the following methods:

- **Software**, using EasyMotion Studio II, set a specific AxisID value in the range of 1-255 within the AxisID settings under the setup section.
 - Hardware, in EasyMotion Studio II, select the 'H/W' option under AxisID settings in the setup section, then set SW3 & SW4 according to Table 3.4 AxisID selection for Micro 4804 SY system.

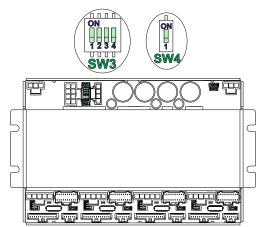


Figure 42 Axis ID switches for Micro 4804 SY

Table 3.4 - AxisID selection for Micro 4804 SY system

				SW3 & SW4	 AxisID Selection 			
SW4		-	W3			-	AxisID	
-	Pin 1	Pin 2	Pin 3	Pin 4	Drive #1	Drive #2	Drive #3	Drive #4
off	off	off	off	off	1	2	3	4
off	off	off	off	on	9	10	11	12
off	off	off	on	off	17	18	19	20
off	off	off	on	on	25	26	27	28
off	off	on	off	off	33	34	35	36
off	off	on	off	on	41	42	43	44
off	off	on	on	off	49	50	51	52
off	off	on	on	on	57	58	59	60
off	on	off	off	off	65	66	67	68
off	on	off	off	on	73	74	75	76
off	on	off	on	off	81	82	83	84
off	on	off	on	on	89	90	91	92
off	on	on	off	off	97	98	99	100
off	on	on	off	on	105	106	107	108
off	on	on	on	off	113	114	115	116
off	on	on	on	on	121	122	123	124
on	off	off	off	off	129	130	131	132
on	off	off	off	on	137	138	139	140
on	off	off	on	off	145	146	147	148
on	off	off	on	on	153	154	155	156
on	off	on	off	off	161	162	163	164
on	off	on	off	on	169	170	171	172
on	off	on	on	off	177	178	179	180
on	off	on	on	on	185	186	187	188
on	on	off	off	off	193	194	195	196
on	on	off	off	on	201	202	203	204
on	on	off	on	off	209	210	211	212
on	on	off	on	on	217	218	219	220
on	on	on	off	off	225	226	227	228
on	on	on	off	on	233	234	235	236
on	on	on	on	off	241	242	243	244
on	on	on	on	on	249	250	251	252

* Not availabile for Micro 4804 SY3 systems

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. The default Axis ID for all Micro 4804 SY is 255. 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.

3.19 Electrical Specifications

- All parameters measured under the following conditions (unless otherwise specified):
- V_{LOG} = 24 VDC; V_{MOT} = 48 VDC; F_{PWM} = 20 kHZ
- Ambient temperature = 25°C (typical values) / 0°C...40°C (min/max values)
- Supplies start-up / shutdown sequence: -any-
- Load current = nominal
- Data is provided for each axis of the system

3.19.1 Operating Conditions

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

3.19.2 Storage Conditions

		Min.	Тур.	Max.	Units
Ambient temperature		-40		100	°C
Ambient humidity	Non-condensing	0		100	%Rh
Ambient Pressure		0		10.0	atm
ESD capability	Not powered; applies to any accessible part			±5	kV
(Human body model)	Original packaging			±15	kV

3.19.3 Mechanical Mounting

			Min.	Тур.	Max.	Units
Airflow		natural convection, clos	ed box			
Spacing rec	g required between adjacent drives 10					
Spacing rec	quired above drive	For counter-connectors & cable bending	30	80		mm

3.19.4 Environmental Characteristics

			Min.	Тур.	Max.	Units	
	Micro 4804 SY3-CAT		110.0 × 71.4 × 01.7				
Weight	Micro 4804 SY3-CAT 118.2 x 71.4 x 21.7 Micro 4804 SY3-CAT 118.2 x 71.4 x 21.7 Micro 4804 SY3-CAT-STO ~4.65 x 2.81 x 0.85	Micro 4804 SY4-CAT	118.2 X / 1.4 X 21.7			mm	
		inch					
Weight Cleaning agents		Micro 4804 SY4-CAT-STO	~	4.05 X 2.01 X	0.00	inch	
Size (Length X Width X Height)	Giobal size	Micro 4804 SX3-CAN	Micro 4804 SY3-CAT 118.2 x 71.4 x 21.7 mi Micro 4804 SY4-CAT 118.2 x 71.4 x 21.7 mi ro 4804 SY3-CAT-STO ~4.65 x 2.81 x 0.85 inc Micro 4804 SY3-CAT-STO ~4.65 x 2.81 x 0.85 inc Micro 4804 SX3-CAN 118.2 x 71.4 x 21.65 mi Micro 4804 SX3-CAN 118.2 x 71.4 x 21.65 mi Micro 4804 SX3-CAN 118.2 x 71.4 x 21.65 mi ro 4804 SX3-CAN-STO ~4.65 x 2.81 x 0.85 inc ro 4804 SX3-CAN-STO ~4.65 x 2.81 x 0.85 inc 804 SY3-CAT 150 804 SY3-CAT inc 804 SY3-CAT 150 804 SY3-CAT 161 4 SY3-CAT-STO 174 804 SX3-CAN 141 9 804 SX3-CAN 141 9 9 804 SX3-CAN 150 4 5 4 SX3-CAN 150 4 5 4 SX3-CAN-STO 152 4 5 4 SX4-CAN-STO 165 5 5 mmended Only Water- or Alcohol- based 5 <td>mm</td>	mm			
		Micro 4804 SX4-CAN					
		Micro 4804 SY3-CAT 118.2 x 71.4 x 21.7 mi Micro 4804 SY3-CAT-STO ~4.65 x 2.81 x 0.85 inco Micro 4804 SY3-CAT-STO ~4.65 x 2.81 x 0.85 inco Micro 4804 SY3-CAT-STO ~4.65 x 2.81 x 0.85 inco Micro 4804 SX3-CAN 118.2 x 71.4 x 21.65 mi Micro 4804 SX3-CAN 118.2 x 71.4 x 21.65 mi Micro 4804 SX3-CAN 118.2 x 71.4 x 21.65 mi Micro 4804 SX3-CAN 118.2 x 71.4 x 21.65 mi Micro 4804 SX3-CAN-STO ~4.65 x 2.81 x 0.85 inco Micro 4804 SY3-CAT 150 micro 4804 SY3-CAT 150 Micro 4804 SY3-CAT 159 micro 4804 SY3-CAT 9 Micro 4804 SY3-CAT-STO 161 9 9 Micro 4804 SY3-CAT-STO 174 9 9 Micro 4804 SX3-CAN 150 141 9 Micro 4804 SX3-CAN 150 152 152 Micro 4804 SX3-CAN-STO 165 165 165 Cleaning is recommended Only Water- or Alcohol- based 165					
		Micro 4804 SX4-CAN-STO	2	4.05 X 2.01 X	0.85	Inch	
Size (Length x Width x Height) Global size Micro 4804 SY3-CAT Micro 4804 SY3-CAT 118.2 x 71.4 x 21.7 Micro 4804 SY3-CAT-STO Micro 4804 SY3-CAT-STO ~4.65 x 2.81 x 0.85 Micro 4804 SY3-CAT-STO Micro 4804 SX3-CAN 118.2 x 71.4 x 21.65 Micro 4804 SY3-CAT-STO Micro 4804 SX3-CAN 118.2 x 71.4 x 21.65 Micro 4804 SY3-CAT 118.2 x 71.4 x 21.65 Micro 4804 SY3-CAT-STO Micro 4804 SX3-CAN-STO ~4.65 x 2.81 x 0.85 Micro 4804 SY3-CAT 150 Micro 4804 SY3-CAT 150 Micro 4804 SY3-CAT 161 Micro 4804 SY3-CAT 150 Micro 4804 SY3-CAT-STO 161 Micro 4804 SY3-CAT-STO 161 Micro 4804 SY3-CAT-STO 161 Micro 4804 SY3-CAT-STO 150 Micro 4804 SX3-CAN 150 Micro 4804 SX3-CAN 150 Micro 4804 SX3-CAN-STO 152 Micro 4804 SX3-CAN-STO 152 Micro 4804 SX4-CAN-STO 165 Cleaning agents Dry cleaning is recommended Only Water- or Alcohol-te	Micro 4804 SY3-CAT		150				
	Micro 4804 SY4-CAT		159				
	M	icro 4804 SY3-CAT-STO	161				
		a					
		Micro 4804 SX3-CAN		141		y	
		Micro 4804 SX4-CAN		150			
	Mi	icro 4804 SX3-CAN-STO		152			
	Mi	icro 4804 SX4-CAN-STO		165		7	
Cleaning agents	Dry cleaning	is recommended		Only Water- o	r Alcohol- bas	ed	
Protection degree	According to	IEC60529		IP20		-	

3.19.5 Logic Supply Input (+V_{LOG})

			Min	Тур	Max.	Units
0	Nominal values		6	24	48	V _{DC}
Supply voltage	Absolute maximum	values, drive operating but outside guaranteed parameters	4.9		50	V _{DC}
vollage	Absolute maximum	values, continuous	-0.5		48	V _{DC}
0	+V _{LOG} = 12V			90	150	
Supply	+V _{LOG} = 24V			60	90	mA
current	+V _{LOG} = 48V			45	60	
Utilization	category	Acc. to 60947-4-1 (I _{PEAK} <=1.05*I _{NOM})				-

¹ Operating temperature at higher temperatures is possible with reduced current and power ratings

² Micro 4804 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.

3.19.6 Motor Supply Input (+V_{MOT})

		Min	Тур.	Max.	Units
O	Nominal values	7		48	V _{DC}
Supply voltage	Absolute maximum values, drive operating but outside guaranteed parameters	6		50	V _{DC}
vollage	Absolute maximum values, continuous	-0.5		53	V _{DC}
Supply	Idle		0.3		mA
current	Operating	-16	±7	50 53 +16 5 ±0.25	А
Voltage Meas	surement error		±0.15	±0.25	V
Utilization cat	tegory Acc. to 60947-4-1 (I _{PEAK} <=4.0*I _{NOM})		DC-3		

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

				Min.	Тур.	Max.	Units
	PMSM motors sinusoidal amplitude					±8	А
Nominal current	PMSM motors sinusoidal RMS					5.7	A _{RMS}
	DC/BLDC/STEP motors continuous					7	А
Peak current	maximum 4 seconds			-16		+16	А
Short-circuit protection	threshold				±25	±28	А
Short-circuit protection	delay			2.6		3.5	μs
On State voltage drop	Nominal output current; including typical ma resistance	ating connec	ctor contact		50	70	V
Off State leakage curre	nt				0.3	1	mA
Accuracy (FS = Full Scale) Current measurement Noise (current ≤ 2A) Noise (current ≥ 2A)			±1	±1.5	%FS		
	Noise (current ≤ 2A)		±4	±6	mA		
Current measurement	Noise (current ≥ 2A)				±30	±50	IIIA
	Offset drift (compensated @ AxisOn)					±0.16	mA/⁰C
		Fast loop ¹	V _{MOT}				
Matan industance	Decomposition of the state of the state	50µs	48V		133		
Nominal current PMSM motors sinu DC/BLDC/STEP m Peak current maximum 4 second Short-circuit protection threshold Short-circuit protection delay Nominal output of resistance On State voltage drop Nominal output of resistance Off State leakage current Accuracy (FS = Fu Noise (current $\leq 2/$ Noise (current $\geq 2/$ Offset drift (competence Motor inductance Recommended value	circuit protection, triggered by ripple	100µs	48V		266		μH
(phase-to-phase)	circuit protection, triggered by hpple	50µs	24V		66		
		100µs	24V		133	$ \begin{array}{r} \pm 8 \\ 5.7 \\ 7 \\ +16 \\ \pm 28 \\ 3.5 \\ 70 \\ 1 \\ \pm 1.5 \\ \pm 6 \\ \pm 50 \\ \end{array} $	
		F _{PWM} = 20 k	Hz		330		
Maten alastriaal tima	Decomposed of value for 15% compart	F _{PWM} = 40 kHz			170		
	-	$F_{PWM} = 60 \text{ k}$	Hz		140		μs
		F _{PWM} = 80 k	Hz		80		
		F _{PWM} = 100	kHz		66		

3.19.8 Supply Output (+5V)

		Min.	Тур.	Max.	Units
Output voltage	Current sourced = 400mA	5.05	5.2	5.25	V
Output current ²	Output voltage ≥ 4.85V			1,200	mA
Short-circuit to GND protection Yes / Drive resets at event		sets at event			
Over-voltage protect		NOT pro	otected		
ESD protection	Human body model	±1			KV

3.19.9 Digital Inputs (IN0, IN1, IN2/LSP, IN3/LSN, IN4, IN5/ENA³)

			Min.	Тур.	Max.	Units
Mode compliance			NP	N (sink)		
Default state	Input floating (wiring disconnected)			Log	jic HIGH	
	Logic "LOW"			1.4	1.8	
	Logic "HIGH"	IN0, IN1, IN4, IN5/ENA ³	3.1	2.5		
	Hysteresis		0.9	1.1	1.4	
1	Logic "LOW"			1.4	1.6	
Input	Logic "HIGH"	IN2/LSP, IN3/LSN	4	3.5		V
voltage	Hysteresis			0.6		
	Floating voltage (not connected)			4.7		
	Absolute maximum continuous	IN2/LSP, IN3/LSN, IN5/ENA ³	-2		+80	
	Absolute maximum, continuous	IN0, IN1, IN4	-0.5		V _{LOG} +0.5	
Input	Logic "LOW"; Pulled to GND			6.5	8	
current	Logic "HIGH"; Pulled to +24V			0.2	0.4	mA
Input frequency		0		500	kHz	
Minimum pulse		1			μs	
ESD protection (Human body model)		±2			kV	

 $^{^1}$ Fast loop period of $50 \mu s$ is not possible with all feedback device types.

² Specified currents are intended per drive. Each drive has separate +5V outputs

³ Enable input only for non-STO executions. For STO executions, IN5 functions as a general-purpose input.

3.19.10 Digital Outputs (OUT0, OUT1, OUT4)

				Min.	Тур.	Max.	Units
Mode compliance				NPN ((sink) 24V		
Load type					Resistiv	e, Inductive	;
Default state Not supplied (+V _{LOG} floating)			High-Z	(floating)			
Delault State	Immediately after power-up				Logic	: "HIGH"	
	Logic "LOW"; output current = 1.5	A for OUT0/ 0.05A f	or OUT1, OUT4			0.4	
.	Logic "HIGH"; output current = 0,	no load		4	4.7	5.2	
Output voltage	Logic "HIGH", external load to +V	LOG			V_{LOG}		V
	Absolute maximum, continuous (free-wheeling diodes to +VLOG to GND)		-0.5		V _{LOG} +0.5		
	Absolute maximum, surge (duration \leq 1s) [†]		-1		V_{LOG} +1		
	Logic "LOW", sink current, short	For many	OUT1, OUT4			0.1	
		5s max	OUT0			2	A
	duration, duty cycle <=1%	0.5s max	OUT1, OUT4			0.15	
			OUT0			2.5	A
Output current	OUT1, OUT4		OUT1, OUT4			0.05	1
		Logic "LOW", sink current, continuous; $V_{OUT} \le 0.4V$ OUT0				1.5	
	Logic "HIGH", source current; exte	ernal load to GND; \	/ _{OUT} ≥ 2.0V			5	mA
	Logic "HIGH", leakage current; ex	Logic "HIGH", leakage current; external load to +V _{LOG} ; V _{LOG} =2			0.18	0.2	mA
$V_{OUT} = V_{LOG} \max = 40V$ $V_{LOG} = 48V$			0.42	0.45	ША		
Minimum pulse v	vidth			0.5			μs
ESD protection - Human body model			±25			kV	

3.19.11 Encoder Inputs(A1+, A1-, B1+, B1-, Z1+, Z1-, A2+, A2-, B2+, B2-)¹

	Γ	Min.	Тур.	Max.	Units
Single-ended mode compliance	Leave A1-, B1-, Z1-, A2-, B2- floating	TTL / CMC	S / Open-co	llector (NF	'N sink)
Single-ended threshold	A1+, B1+, Z1+, A2+, B2+	1.3	1.4	1.5	V
Single-ended input current	Input pulled to GND against on-board 2.2 K Ω pullup to +5V		2.4	2.7	mA
Differential mode compliance	For full RS422 compliance, see ²		TIA/EIA-4	22-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	Common-mode (A1+ to GND, etc.)		2.2		kΩ
input impedance, diferential	Differential (A1+ to A1-, etc.)		4.4		K12
Input frequency	Differential mode	0		15	MHz
Minimum pulse width	Differential mode	33			ns
ESD protection	Human body model	±30			kV

3.19.12 Hall Inputs (Hall1, Hall2, Hall3)

			Min	Тур.	Max.	Units
Mode compliance		TTL / CMOS / Open-collector (NPN			5V	
Default state	Input floating	(Wiring disconnected)	4.5	4.8	5.2	
		Logic "LOW"		1.5	1.7	
Input	Digital	Logic "HIGH"	3	2.5		V
voltage		Hysteresis		0.5		
_	Analog		0	0.54.5	4.95	
land the summer t	Logic "LOW";	Pull to GND		2.3		
Input current	Logic "HIGH"; Internal 2.2KΩ pull-up to 5V			0		mA
Minimum pulse width				66		μs
ESD protection	Human body model			±15		kV

3.19.13 RS-232

		Min.	Тур.	Max.	Units
Compliance			TIA/E	IA-232-C	
Bit rate	Software selectable	9600		115200	Baud
Output voltage		±5	±5.7		V
Short-circuit	232TX to GND		Guaranteed		
Input voltage	Absolute maximum, continuous	-30		+30	V
ESD protection	Human body model	±15			kV

¹ To achieve full RS-422 compatibility and enhance noise rejection, it is necessary to connect an 120Ω resistor across each signal pair (A1+/A1-, B1+/B1-, Z1+/Z1-, A2+/A2-, B2+/B2-). This can be done through SW1 and SW2.

3.19.14 Absolute encoder interface: SSI, BISS-C, EnDAT, Tamagawa, Nikon, Sanyo Denki

		Min.	Тур.	Max.	Units	
Single-ended mode	Not recommended, reduced robustness & speed					
Differential mode compliance	For full RS422 compliance, see ¹	TIA/EIA-422-A				
Output voltage	Differential; 50Ω differential load	1.5	3.3		V	
	Common-mode, referenced to GND	1	1.7	3	V	
	Nikon, Sanyo Denki		2.5, 4			
CLOCK frequency	Panasonic, Tamagawa		2.5		MHz	
	All others		1, 2, 3, 4			
Output Short- circuit protection	Common-mode voltage ±15V	Yes, protected				
			Binary / Gray			
DATA format	Software selectable		Single-turn / Multi-turn			
DATA Iomat			Counting direction			
			CF	RC type		
	Including CRC, flags,			64	Bits	
DATA resolution	If total resolution >31 bits, some bits must be resolution	e ignored by soft	ware setting	to achieve a	a max. 31 bits	

3.19.15 Analog Inputs (REF / FDBK)

		Min.	Тур.	Max.	Units
	Operational range		05, -10	+10	
Input voltage	Absolute maximum values, continuous	-22		+26	V
	Absolute maximum, surge (duration \leq 1s)			±38	
Input impedance	To 1.44V		20		kΩ
Bandwidth (-3dB)	Software selectable	0		5.3	kHz
Resolution			12		bits
Integral linearity				±1	bits
Offset error	Range -10V +10V		±3	±10	bits
Oliset enoi	Range 0+5V		±10	±30	DIIS
Gain error	Range -10V +10V		±0.3	±0.5	%
Gainenu	Range 0+5V		±0.5	±0.8	70
ESD protection	Human body model	±1.5			kV

3.19.16 EtherCAT® (Micro 4804 SY System)

		Min.	Тур.	Max.	Units		
Compliance		IEEE802.3	, IEC61158				
Software protocols co	(CoE, FoE, EoE,	IEC61800-7-302	1			
Transmission line	According to TIA/FIA FGQ F A	5	5e	6	Category		
	According to TIA/EIA-568-5-A	UTP	FTP	STP	Shield		
	swap + / - inside a pair		Yes (MLT3	encoding)			
Auto	swap Rx / Tx pairs		Yes (auto-MDI/MDIX)				
	Swap port0(IN) / port1(OUT)		NO (EtherCAT requirement)				
Configured Station Alias (using AxisID)		1 ÷ 25	1 (SY3), 1 ÷ 252	(SY4)	-		
ESD protection	Human body model	±5			kV		

3.19.17 CAN-Bus (Micro 4804 SX System)

			Min.	Тур.	Max.	Units
Compliance				CAN 2.0B,	SO 11898-2	
Software protocols			CiA301,	CiA305, CiA40	2, TechnoCAN, TI	MLcan
Bit rate	Software selectable	e	12	5, 250, 500, 10	00	KBaud
Nede eddroseing	TMLcan	014/01t-t-t-t-			-	
Node addressing	CANopen	SW3 selectable	1÷123 (SX3), 1÷124 (SX4)			-
	Common-mode, op	perating	-12		+12	V
Voltage	Common-mode, max. continuous		-58		+58	V
	Differential, max. continuous		-45		+45	V
Innutimnadanaa	Differential		40		90	KΩ
Input impedance	Common-mode		20		45	KΩ
Termination resistor (120Ω)				Include	d – SW5	
ESD protection	Human body mode	1	±10			kV

 $^{^{1}}$ To achieve full RS-422 compatibility and enhance noise rejection, it is necessary to connect an 120 Ω resistor across each signal pair (A1+/A1-, B1+/B1-, Z1+/Z1-, A2+/A2-, B2+/B2-). This can be done through SW1 and SW2.

3.19.18 Safe Torque OFF (STO1+; STO1-; STO2+; STO2-)¹

		Min.	Тур.	Max.	Units	
Safety Integrity Leve		SIL 3				
Performance Level			PL	е		
Safety Category			Ca	it 3		
Reaction time				30	ms	
Ignored diagnostic	Duration			5	ms	
pulses	Repetition rate			20	Hz	
MTTFd			377		years	
DC			90		%	
PFH			8E-10		hours	
Lifetime			20		years	
V _{LOG}	External power supply	SELV or PELV				
Pollution Degree				2	-	
1 olidion Degree	Cabinet / Housing	IP54			-	
STO wiring	Bundling / Grouping		Separate wiring			
STO WILLING	Shielding	Separate shield for STO1, STO2				
Compatibility	Each STO channels has separate + and - terminals	PNP (so	urce) or NPN (s conne	sink), dependin ection	g on user	
Isolation		E	ach STO chann	el is opto-isolat	ted	
	Inactive (torque off)		0	5.6	V	
Voltage, STOx+ to STOx-	Active (motor driven)	18	24		V	
510X-	Abs. maximum, continuous	-70		+70	V	
Valtaria	Isolation, STO1 to STO2	±2			KV	
Voltage	Isolation, STOx to GND	±2			KV	
Current	STOx+ - STOx- = 24V		3	5	mA	
ESD protection	Human body model	±30			kV	

3.19.19 Conformity

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

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

¹ For the STO executions: P020.103.E404, P020.103.E403, P020.203.E404 and P020.203.E403

Micro 4804 has 2 types of memory available for user applications: 16Kwords SRAM and 24Kwords E2ROM memory per axis.

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

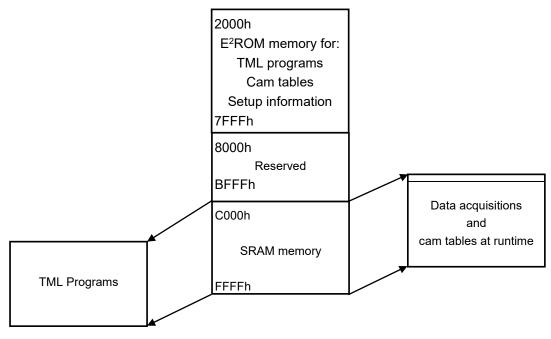


Figure 43 Micro 4804 Memory Map

