Installation Guide
Encoder Output Module

ENG

EE01-X13

Please visit http://www.linmot.com to check for the latest version of this document!

Content

1 General Information

1.1 Introduction

This manual includes instructions for the assembly, installation, maintenance, transport, and storage of the encoder module. The document is intended for electricians, mechanics, service technicians, and warehouse staff.
Read this manual before using the product and always observe the general safety instructions and those in the relevant section.
Keep these operating instructions in an accessible place and make them available to the personnel assigned.

1.2 Explanation of Symbols

Triangular warning signs warn of danger.

Round command symbols tell what to do.

1.3 Qualified Personnel

All work such as installation, commissioning, operation, and service of the product may only be carried out by qualified personnel.
The personnel must have the necessary qualifications for the corresponding activity and be familiar with the installation, commissioning, operation, and service of the product. The manual and in particular the safety instructions must be carefully read, understood, and observed.

1.4 Liability

NTI AG (as manufacturer of LinMot and MagSpring products) excludes all liability for damages and expenses caused by incorrect use of the products. This also applies to false applications, which are caused by NTI AG's own data and notes, for example during sales, support or application activities. It is the responsibility of the user to check the data and information provided by NTI AG for correct applicability in terms of safety. In addition, the entire responsibility for safety-related product functionality lies exclusively with the user. Product warranties are void if products are used with stators, sliders, servo drives, or cables not manufactured by NTI AG unless such use was specifically approved by NTI AG.
NTI AG's warranty is limited to repair or replacement as stated in our standard warranty policy as described in our "terms and conditions" previously supplied to the purchaser of our equipment (please request copy of same if not otherwise available). Further reference is made to our general terms and conditions.

1.5 Copyright

2 Safety Instructions

For your personal safety

Disregarding the following safety measures can lead to severe injury to persons and damage to material:

- Only use the product as directed.
- Never commission the product in the event of visible damage.
- Never commission the product before assembly has been completed.
- Do not carry out any technical changes on the product.
- Only use the accessories approved for the product.
- Only use original spare parts from LinMot.
- Observe all regulations for the prevention of accidents, directives and laws applicable on site.
- Transport, installation, commissioning, and maintenance work must only be carried out by qualified personnel.
- Observe IEC 364 and CENELEC HD 384 or DIN VDE 0100 and IEC report 664 or DIN VDE 0110 and all national regulations for the prevention of accidents.
- According to the basic safety information, qualified, skilled personnel are persons who are familiar with the assembly, installation, commissioning, and operation of the product and who have the qualifications necessary for their occupation.
- Observe all specifications in this documentation.
- This is the condition for safe and trouble–free operation and the achievement of the specified product features.
- The procedural notes and circuit details described in this documentation are only proposals. It is up to the user to check whether they can be transferred to the applications. NTI AG / LinMot does not accept any liability for the suitability of the procedures and circuit proposals described.
- LinMot servo drives, and the accessory components can include live and moving parts (depending on their type of protection) during operation. Surfaces can be hot.
- Non–authorized removal of the required cover, inappropriate use, incorrect installation, or operation create the risk of severe injury to persons or damage to material assets.
- For more information, please see the documentation.
- High amounts of energy are produced in the drive. Therefore, it is required to wear personal protective equipment (body protection, headgear, eye protection, hand guard).

Application as directed

- Drives are components, which are designed for installation in electrical systems or machines. They are not to be used as domestic appliances, but only for industrial purposes according to EN 61000–3–2.
- When drives are installed into machines, commissioning (i.e., starting of the operation as directed) is prohibited until it is proven that the machine complies with the regulations of the EC Directive 2006/42/EG (Machinery Directive); EN 60204 must be observed.
- Commissioning (i.e., starting of the operation as directed) is only allowed when there is compliance with the EMC Directive (2014/30/EU).
- The technical data and supply conditions can be obtained from the nameplate and the documentation. They must be strictly observed.

Transport, storage

- Please observe the notes on transport, storage, and appropriate handling.
- Observe the climatic conditions according to the technical data.

Installation

- The drives must be installed and cooled according to the instructions given in the corresponding documentation.
- The ambient air must not exceed degree of pollution 2 according to EN 61800−5−1.
- Ensure proper handling and avoid excessive mechanical stress. Do not bend any components and do not change any insulation distances during transport or handling. Do not touch any electronic components and contacts.
- Drives contain electrostatic sensitive devices, which can easily be damaged by inappropriate handling. Do not damage or destroy any electrical components since this might endanger your health!

Electrical connection

- When working on live drives, observe the applicable national regulations for the prevention of accidents.
- The electrical installation must be carried out according to the appropriate regulations (e.g. cable cross−sections, circuit breakers, fuses, PE connection). Additional information can be obtained from the documentation.
- This product can cause high-frequency interferences in non-industrial environments, which can require measures for interference suppression.

Operation

- If necessary, systems including drives must be equipped with additional monitoring and protection devices according to the valid safety regulations (e.g. law on technical equipment, regulations for the prevention of accidents). The drives can be adapted to your application. Please observe the corresponding information given in the documentation.
- After the drive has been disconnected from the supply voltage, all live components and power connections must not be touched immediately because capacitors can still be charged. Please observe the corresponding stickers on the drive. All protection covers and doors must be shut during operation.

Burn Hazard

The heat sink (housing) of the drive can have an operating temperature of > 80 °C: Contact with the heat sink results in burns.

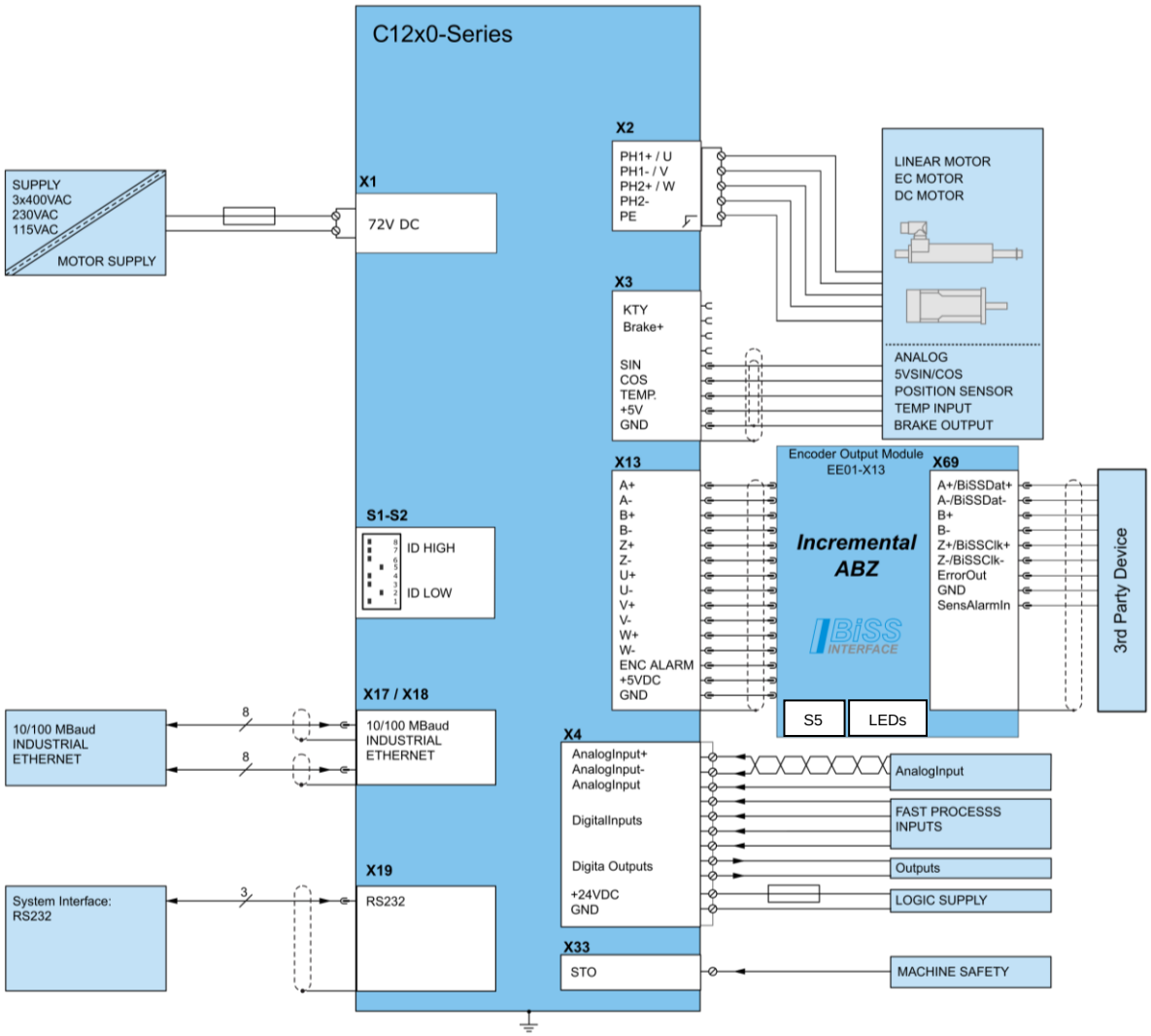
Caution - Risk of Electric Shock!

- Before servicing, disconnect supply, wait 5 minutes and measure between PWR+ and PGND to be sure that the capacitors have discharged below 42 VDC.
- The power terminals Ph1+, Ph1-, Ph2+, Ph2- and PWR+ remain live for at least 5 minutes after disconnecting from the power supplies.

Grounding

All metal parts that are exposed to contact during any user operation or servicing and likely to become energized shall be reliably connected to the means for grounding.

3 System Overview



Typical servo system C1250: Servo drive, motor and power supply with connected Encoder Output Module

4 Compatibility

All series C12xx, C14xx and E14xx drives can be used with the encoder output module.

Configuration of all relevant parameters is done with LinMot-Talk in the drive's configuration.

5 Functionality

Supported output interfaces	EE01-X13
Incremental ABZ encoder output	●
BiSS-C encoder output	●

6 Software

The configuration software LinMot-Talk is free of charge and can be downloaded from the LinMot homepage.

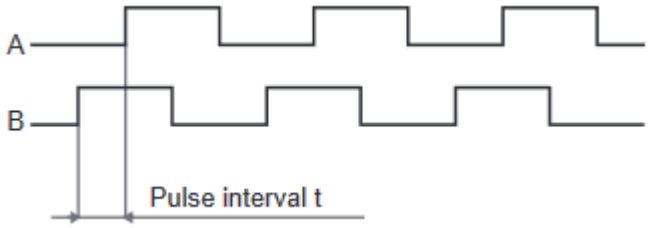
Configuration of the encoder output module is only possible with LinMotTalk 6.12 and FW-version V6S12b01 or higher installed on the drive.

7 Configuration

1. To use the Encoder Output Module on X13 set UPID 125Ch to “Encoder Simulation EE01”
2. Configure the output Type with UPID 14EAh to either incremental ABZ or BiSS
3. If ABZ is configured set the resolution and the counter frequency with UPIDs 14EBh and 14ECh

Relevant UPIDs	Name	Description
125Ch	**Sensor Type**	This parameter defines the type of the position sensor on X13
14EAh	**Sensor Output Type**	This parameter defines the sensor output type for the EE01
14EBh	**Resolution (1/4 period length)**	This parameter defines the resolution of the signal period of the incremental signal. The distance that should be equal to one pulse interval (distance between rising edge of A and rising edge of B signal) has to be entered here.
14ECh	**Frequency**	Limit simulated encoder counts per second (f_counter)

Example:



Min. pulse interval t = 250 ns

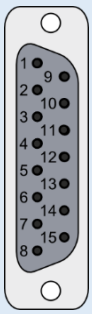
For coerrect evaluation, the following minimal counter frequency is required:

f_counter = 1 / pulse interval = 1 / 250 ns = 4 MHz

Description of the connectors / Interfaces

The module is directly connected to the drive via its X13 connector.

7.1 X69

X69	Encoder Output		
		**ABZ**	**BiSS-C**
	1	Do not connect	Do not connect
	9	A+	DATA+
	2	A-	DATA-
	10	B+	Do not connect
	3	B-	Do not connect
	11	Z+	CLK+
	4	Z-	CLK-
	12	Sens Alarm IN	Sens Alarm IN
	5	DGND	DGND
	13	Error OUT	Error Out
	6	Do not connect	Do not connect
	14	Do not connect	Do not connect
	7	Do not connect	Do not connect
	15	Do not connect	Do not connect
	8	Do not connect	Do not connect
	case	Shield	Shield

DSUB-15 (f)

Incremental ABZ outputs (RS422):
Counter frequency: 50 kHz - 4'000 kHz (SW-configurable)
Position Resolution: 1-255 um (SW-configurable)

BiSS-C output (RS485):

Singleturn Position Resolution	µm	1
Data Type		SCDS (Single Cycle Data Sensor)
Data (Bits)		Position: Multiturn 16, Singleturn 18; nER 1; nWA 1
Data Format and Alignment		Binary coded, MSB first, right aligned
CRC polynomial		0x43 ($X^6 + X^1 + X^0$) – CRC bit length 6 bits, CRC is inverted
CRC Starting Value		0x00
BiSS Timeout (tm)	µs	~20
Switch-on Delay	ms	100

Enc. Alarm In:
5V / 1 mA
Error Out:
open collector output with internal 1k pull-up to 3.3V

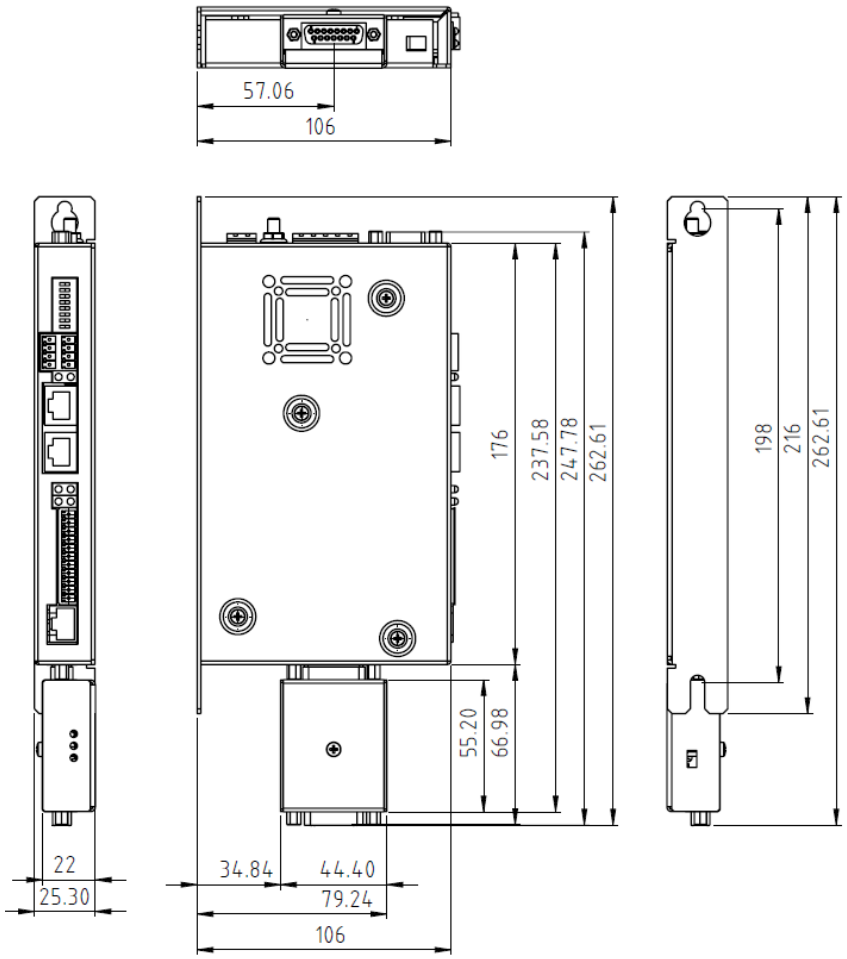
7.2 LEDs

LEDs	State Displays		
	Signal:	**Color:**	**Description:**
	PWR OK	Green	On: Logic Supply OK, Off: Logic Supply not OK
	Warn	Yellow	On: Communication with Drive not established, Off: Communication with drive established once
	Error	Red	On: Error (e.g. communication with drive lost), Off: No Error (Mirrors signal state of Error OUT)

7.3 Switch S5

S5	Bootstrap
	Bootstrap (for internal use only)

8 Physical Dimension



EE01-X13 is show with a C1250 Drive for reference

Encoder Output Module		EE01-X13
Width	mm	44.4
Height	mm	22
Depth	mm	55.2
Weight	g	90
Case, Degree of Protection	IP	20
Storage Temperature	°C	-25...40
Transport Temperature	°C	-25...70
Operating Temperature	°C	0...40 at rated data
Relative humidity		< 95% (non-condensing)
Pollution	IEC/EN 60664-1	Pollution degree 2
Shock resistance (16ms)		3.5g
Vibration resistance (10-200Hz)		1g
Max. Case Temperature	°C	50
Max. Power Dissipation	W	1
Mounting place		In the control cabinet

9 Ordering Information

Name	Description	Art. No.
EE01-X13	Encoder Output Module	0150-5819

10 International Certifications

Certifications	
Europe	See chapter 10.1 EU Declaration of Conformity CE Marking
UK	See chapter 10.2 UK Declaration of Conformity UKCA Marking

10.1 EU Declaration of Conformity CE Marking

NTI AG / LinMot ®

Bodenaeckerstrasse 2

8957 Spreitenbach

Switzerland

Tel.: +41 (0)56 419 91 91

Fax: +41 (0)56 419 91 92

declares under sole responsibility the compliance of the products:

- **EE01-X13 (Art.-No.:0150-5819)**

with the EMC Directive 2014/30/EU.

Applied harmonized standards:

- EN 61800-3:2004 + A1:2012
- EN 61800-3:2018

According to the EMC directive, the listed devices are not independently operable products.

Compliance of the directive requires the correct installation of the product, the observance of specific installation guides and product documentation. This was tested on specific system configurations.

The safety instructions of the manuals are to be considered.

The product must be mounted and used in strict accordance with the installation instructions contained within the installation guide, a copy of which may be obtained from NTI AG.

Company: NTI AG

Spreitenbach, 05.04.2023

Dr. Ronald Rohner / CEO NTI AG

10.2 UK Declaration of Conformity UKCA Marking

NTI AG / LinMot ®

Bodenaeckerstrasse 2

8957 Spreitenbach

Switzerland

Tel.: +41 (0)56 419 91 91

Fax: +41 (0)56 419 91 92

declares under sole responsibility the compliance of the products:

- **EE01-X13 (Art.-No.:0150-5819)**

with the EMC Regulation S.I. 2016 No. 1091.

Applied designated standards:

- EN 61800-3:2004 + A1:2012
- EN 61800-3:2018

According to the EMC regulation, the listed devices are not independently operable products.

Compliance of the regulation requires the correct installation of the product, the observance of specific installation guides and product documentation. This was tested on specific system configurations.

The safety instructions of the manuals are to be considered.

The product must be mounted and used in strict accordance with the installation instructions contained within the installation guide, a copy of which may be obtained from NTI AG.

Company: NTI AG

Spreitenbach, 05.04.2023

Dr. Ronald Rohner / CEO NTI AG

ALL LINEAR MOTION
FROM A SINGLE SOURCE

Europe / Asia Headquarters

NTI AG - LinMot & MagSpring
Bodenaeckerstrasse 2
CH-8957 Spreitenbach
Switzerland

Sales / Administration: +41 56 419 91 91
office@linmot.com

Tech. Support: +41 56 544 71 00
support@linmot.com

Web: https://www.linmot.com/

North / South America Headquarters

LinMot USA Inc.
N1922 State Road 120, Unit 1
Lake Geneva, WI 53147
USA

Sales / Administration: 262.743.2555
usasales@linmot.com

Tech. Support: 262.743.2555
usasupport@linmot.com

Web: https://www.linmot-usa.com/

Visit https://linmot.com/contact/ to find a distributor near you.