Low Profile Drive Size 1 - Size 2 - Size 3

Elife-Drive SR Series





Application Reference Manual



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Overview

SR Elife-Drive is the family of drivers designed to drive the various types of low-voltage servomotors, specifically for use in battery powered devices. The compact form was made possible thanks to the high efficiency of the design, manufactured with state-of-art electronic components. Elife-Drive is highly configurable, a wide range of programmable parameters allow you to customize your system for your needs.

The main key features include:

- Designed to drive from 12 V to 96 V Brushless, Brushed and AC ServoMotors.
- The different types of feedback are supported: *Resolver*, *SinCos*, *Hall Sensors*, *Incremental Encoder*, *Fa-Coder*, *SSI*, *Sensorless*.
- Advanced algorithms for predictive speed and torque control.
- CANopen[®] modes of operation:¹: Profile Velocity Mode, Torque Profile Mode, Profile Position Mode, Homing Mode and Cycilic Sync Position Mode
- Electromagnetic Holding Brake Output with DPR System (Dynamic Power Reduction)
- SR Size 1 and Size 2 Dedicated Safe Torque Off (STO) input
- SR Size 3 Dedicated Safe Torque Off SIL 3 (STO SIL 3) 2xinputs
- Telemetry of the Internal functions
- European Conformity C €, and designed and tested in accordance with the EMC emission (EN 61000-6-4) and immunity (EN 61000-6-2) standards. Elife-Drive is compliant with EN 60950-1 safety requirements.

 $^{^1}$ Elife International is a Member of $\mathbf{CiA}^{\circledast}$ - CAN in Automation

Specification:

- **Sour Quadrant Regenerative Operation**
- Space Vector Modulation Technology
- Sinusoidal and Trapezoidal Commutation Methods
- ☑ Programmable Gain Setting
- **Fully Configurable Velocity and Position Limits**
- ☑ On-the-fly Mode and Gain Set Switching
- Emergency Deceleration Ramp (Emergency) Input
- 🗹 Safe Torque Off (STO) Input

Programmable Input/Output:

- Six Digital *Inputs* Single Ended
- → One 12-bit Analog Input $0 \div 10$ V
- ➡ Four Digital Outputs Singled Ended
- Generation ← One High Powered Brake Output
- ↔ One Programmable 5 or 10V 100mA Throttle Output

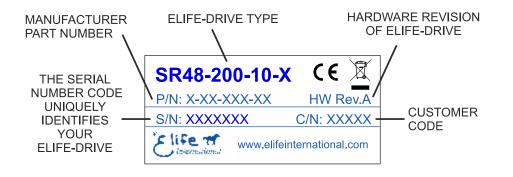
SIZE 1	Nominal Battery Voltage - Max Motor Power			
120x85x38 mm	12V - 400W	24V - 800W	48V - 1.6kW	
PHASE CURRENT *	10V ÷ 22V	16V ÷ 34V	28V ÷ 70V	
up to 35 Arms	SR12-35-040-x	SR24-35-080-x	SR48-35-1.6-x	
up to 70 Arms	SR12-70-040-x	SR24-70-080-x	SR48-70-1.6-x	

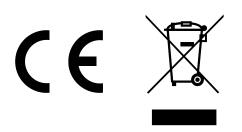
SIZE 2 NOMINAL BATTERY VOLTAGE - MAX MOTOR POWER				
195x95x32 mm	12V - 2.5kW	24V - 5kW	48V - 10kW	72V - 15kW
PHASE CURRENT *	10V ÷ 22V	16V ÷ 34V	28V ÷ 75V	46V ÷ 100V
up to 100 Arms	SR12-100-2.5-x	SR24-100-5-x	SR48-100-10-x	SR72-100-15-x
up to 200 Arms	SR12-200-2.5-x	SR24-200-5-x	SR48-200-10-x	SR72-200-15-x
SIZE 3		D		
			RY VOLTAGE - MA	
220x120x32 mm	12V - 7kW	24V - 14kW	48V - 28kW	72V - 43kW
PHASE CURRENT *	10V ÷ 22V	16V ÷ 34V	28V ÷ 75V	46V ÷ 100V
up to 400 Arms	SR12-400-7-x	SR24-400-14-x	SR48-400-28-x	SR72-400-43-x
up to 600 Arms	SR12-600-7-x	SR24-600-14-x	SR48-600-28-x	SR72-600-43-x

* The value of the maximum continuous (60 min) RMS phase current is ensured with an appropriate heat sink.

Product Identification Label

Most of information about your Elife-Drive - such as *serial number*, model, customer information, *etc* - can be found on a label located on the front of the Elife-Drive (see figure below). Some of these information might be requested when you contact the technical assistance.





Compliance with the EU regulatory requirement for electrical and electronic equipment. When your Elife-Drive is no more usable, can't be treated as generic garbage, but must be disposed of at a collection point for recycling of electrical and electronic equipment, in compliance with the **WEEE** regulation (Waste of Electrical and Electronic Equipment).

Installation and Wiring

2.1 Mounting Elife-Drive on-board

The Elife-Drive can be mounted in any orientation, but you must choose a location in order to keep the controller **clean** and **dry**, aways from sunlight, water and ice. When you mount the Elife-Drive on-board you should **ensure an effective heat dissipation** between the Elife-Drive and the vehicle surface.

Elife-Drive has a LED light on the front of the device that visually explains what the driver is doing (see Section 3.1), if you want it to be visible you should take this into consideration before choosing the location where your Elife-Drive will be mounted.

N Warning

In order to ensure the proper functioning of the Elife-Drive you must keep the controller clean and dry and ensure an effective heat exchange between the Elife-Drive and the vehicle surface.

The installation must be performed with an adequate heat exchange between the Elife-Drive and the surface on which it will be placed. In Figure 2.1 is shown a suggested installation method in order to ensure an effective heat dissipation between the Elife-Drive and the surface on which it will be placed.

-`ö́- Tips and Advice

A thermal grease should be used on the rear side of the Elife-Drive heatsink to improve the heat exchange between Elife-Drive and the surface on which it will be placed.

If the installation method shown in Figure 2.1 is not sufficient to ensure an effective heat dissipation from the Elife-Drive, you should install a Fan Cooler or a Liquid Cooler on your Elife-Drive.

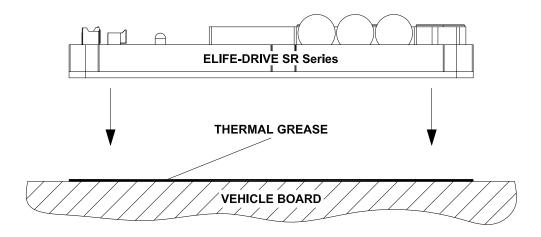


Figure 2.1: A recommended installation method in order to ensure an effective heat dissipation between the Elife-Drive and the surface on which it will be placed. A thermal grease should be used between the Elife-Drive and the surface on which it will be placed.

2.2 Connections

Elife-Drive on the front has different types of connectors:

High Power Connections

The three-phase alternating-current generated by Elife-Drive is supplied through the U,V,W terminals.

The **B+** and **B-** are the positive and negative terminals to connect to your battery.

You must connect an external fuse between the **B+** terminal and the positive battery terminal. (see Section 2.2.1)

Low Power Connections

4 pins female connector for STO SIL 3 Inputs
6 pins female connector for Output Signals
8 pins female connector for Digital Communications CANopen[®] and RS232
14 pins female connector for Digital, Analog Input and Command Signals
30 pins female connector for Universal Feedback Interface

Details of the 30 pins female connector

- Resolver Differential Input
- SinCos Differential Input (also works in Single Ended mode)
- Multifunction Differential Input
- . Digital SinCos
- . Digital Endat
- . Generic SSI Encoders
- . Generic SPI Encoders
- . The communication protocols installed are constantly updated as needed
- Multifunction Single Ended Input
- . Hall Sensor
- . Incremental Encoder
- . Fa-Coder
- Motor Thermal Sensor Input
- Power Supply Output

4 pins STO connector (only available on SR Size 3)

- STO SIL 3 certifiable 2x Inputs

2.2.1 High Power Connections

High power connections are provided by: 3-phase supply terminals (U,V,W) and two terminals for battery connections (B+,B-).

In order to connect correctly Elife-Drive, you should use the following instructions:

- 1. Connect the **battery negative** cable to the **B** terminal.
- An external fuse (See Table 2.1) must be fitted from the battery positive to terminal B+ to avoid damage to the controller.



Elife-Drive models haven't any fuse already installed.

Table 2.1: Fuse size in accordance with the Elife-Drive SR Series

ELIFE-DRIVE TYPE	FUSE RATING
SR Size 1	63 A
SR Size 2	250 A
SR Size 3	700 A

* All models of SR Series require an external fuse.

 Connect the U, V, and W motor phases to the 3-phase supply terminals (U,V,W).

Note The tightening torque must be: for SR Size 1 = 2.5 Nm for all five Power Connections for SR Size 2 = 4.5 Nm for all five Power Connections for SR Size 3 = 6.5 Nm for all five Power Connections

 Table 2.2: A summary table of high-power connections

TERMINAL	CONNECT TO	
B+	Battery positive terminal	
В -	Battery negative terminal	
U,V,W	U, V, and W motor phases	

🔊 Warning

When connecting the high power cables, make sure that the feedback cable passes as far as possible from the power cables, possibly with a different path, this to avoid electromagnetic interference.

2.2.2 Low Power Connections

The low power logic control connections are provided by 4 female connectors.

- The feedback interface connector
- The Input/General Purpose connector
- The Output connector
- The Communications interface connector

The pin's description is given in Table below:

	NAME	DESCRIPTION	OPERATING RANGE	
1	R_SIN+	SIN+ - Resolver Input	Resolver standard	
2	R_SIN-	SIN Resolver Input	Resolver standard	
3	R_COS+	COS+ - Resolver Input	Resolver standard	
4	R_COS-	COS Resolver Input	Resolver standard	
5	R_EXC+	EXC+ - Resolver Output	Resolver standard	
6	R_EXC-	EXC Resolver Output	Resolver standard	
7	S_SIN-	SIN Analog SinCos Input	From 0 to 5V	
8	S_SIN+	SIN+ - Analog SinCos Input	From 0 to 5V	
9	S_COS-	COS Analog SinCos Input	From 0 to 5V	
10	S_COS+	COS+ - Analog SinCos Input	From 0 to 5V	
11	DATA+	DATA+ - SSI/SPI Input	RS422 Standard	
12	DATA-	DATA SSI/SPI Input	RS422 Standard	
13	CLK+	CLK+ - SSI/SPI Output	RS422 Standard	
14	CLK-	CLK SSI/SPI Output	RS422 Standard	
15	CSn-SSI	Chip Select Output - SSI	Active low, Imax = 10 mA	
16	CSn-SPI	Chip Select Output - SPI	Active low, Imax = 10 mA	
17	MOSI+	MOSI+ - SPI Output	RS422 Standard	
18	MOSI-	MOSI SPI Output	RS422 Standard	
19	THERM-A	Thermal sensor - Terminal A	•	
20	THERM-B	Thermal sensor - Terminal B		
21	DGND	Digital Common Ground	-	
22	GND_ISO	Insulated Resolver Ground, to be used for HW rev.C and later	-	
23	DGND	Digital Common Ground		
24	5VOUT	+5V Supply Output	Imax = 50mA	
25	H1	H1 - Hall Sensor Input	From 0 to 5V	
26	A	A - Incremental Encoder Input	From 0 to 5V	
27	H2	H2 - Hall Sensor Input	From 0 to 5V	
28	В	B - Incremental Encoder Input	From 0 to 5V	
29	H3	H3 - Hall Sensor Input	From 0 to 5V	
30	Z	Z - Incremental Encoder Input	From 0 to 5V	

Figure 2.2: Feedback Sensor Connections

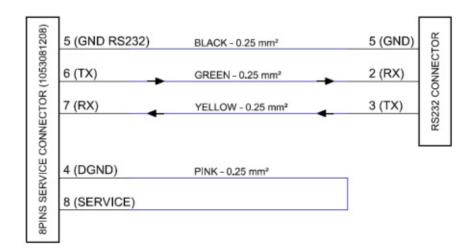
PIN	NAME	DESCRIPTION	OPERATING RANGE	
1	IN1	Digital Input 1	Vmax = 54V, High > 11V	
2	IN2	Digital Input 2	Vmax = 54V, High > 11V	
3	IN3	Digital Input 3	Vmax = 54V, High > 11V	
4	IN4	Digital Input 4	Vmax = 54V, High > 11V	
5	IN5	Digital Input 5	Vmax = 54V, High > 11V	
6	IN6	Digital Input 6	Vmax = 54V, High > 11V	
7	OUT STO	Supply Output - STO	Imax= 50mA	
8	SRV PWR	Service Power	From 10 to Vbatt,max	
9 NC Not Connected		Not Connected	-	
10	DGND	Digital Common Ground		
11	AGND	Analog Ground Reference	-	
12	VDD POT	Supply Output - Potentiometer	Vout = 5V/10V, Imax = 50mA	
13	AIN	Analog Input	From 0 to 5V (or 10V)	
14	IN STO	STO Input	-	
-				

PIN NAME	DESCRIPTION	OPERATING RANGE
1 OUT1	Digital Output 1	Active Low, Imax = 250mA
2 OUT2	Digital Output 2	Active Low, Imax = 250mA
3 OUT3	Digital Output 3	Active Low, Imax = 250mA
4 OUT4	Digital Output 4	Active Low, Imax = 250mA
5 BRAKE OUT	Digital Output for Motor Brake	Active Low, Imax = 2 A
6 COM+	Positive Common - Digital Outputs	Vmax = 54V

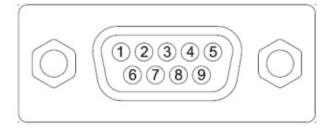
Figure	2.3:	Signal	Command	Connections
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The programming connections is provided by an 8 pins male connector and a DB9 female connector. The cable description is given in Table below:

PIN NAME	DESCRIPTION	OPERATING RANGE
1 -	-	-
2 -		-
3 -	-	-
4 DGND	Digital Common Ground	-
5 GND RS232	RS232 Ground Reference	-
6 TX RS232	TX RS232	Standard RS232
7 RX RS232	RX RS232	Standard RS232
8 SERVICE	1	GND only to upload firmware
	P/N 1053081208 - FEMALE, WIR	3



RS232 CONNECTOR (DB9) - FEMALE, WIRING VIEW



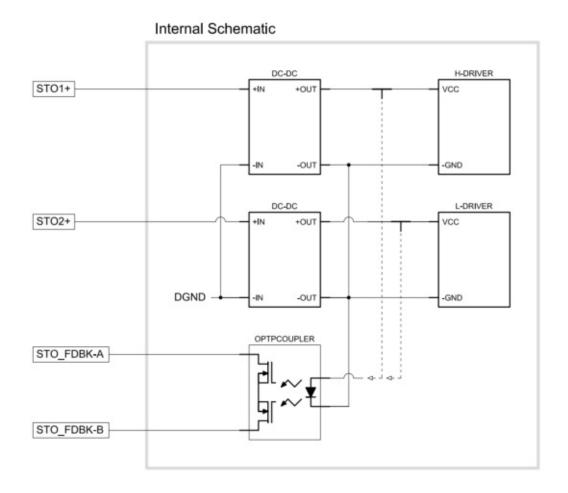
IMPORTANT:

Firmware updating is **ONLY** possible when **STO INPUT** is **LOW**. Make sure to keep **STO SWITCH OPEN** before and during the firmware updating.

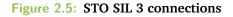
Figure 2.4: Program Connections

The STO SIL 3 Certifiable connections are provided by 4 female connectors.

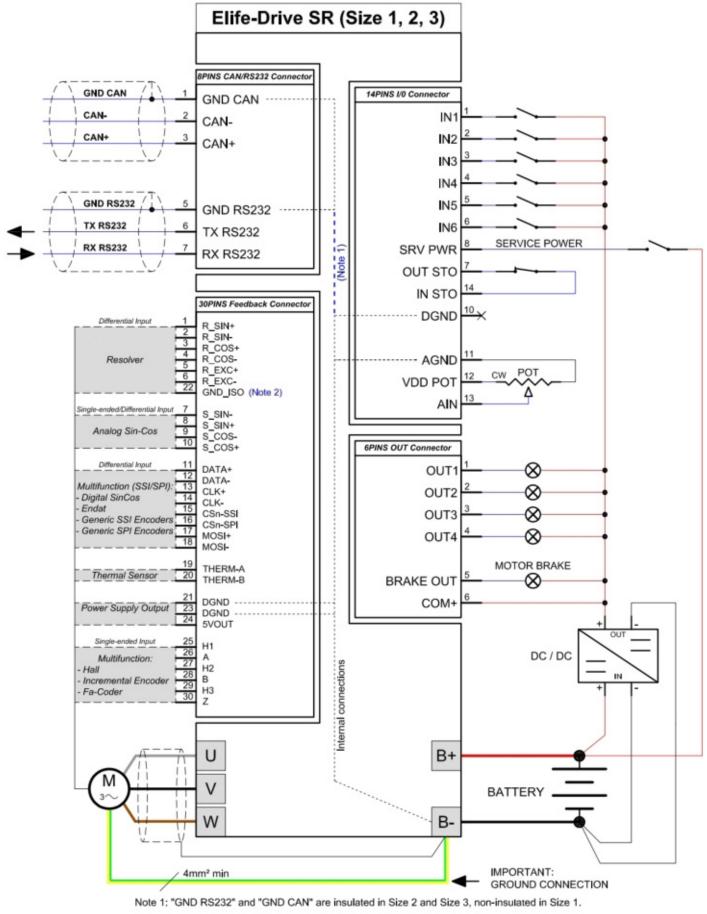
PIN	NAME	DESCRIPTION	OPERATING RANGE
1	STO1+	Positive STO1 Input	From 9 to 36V
2	STO2+	Positive STO2 Input	From 9 to 36V
3	STO_FDBK-A	Internally connected to STO_FDBK-B when STO1+ and STO2+ are both high	From -36 to +36V differential voltage to STO_FDBK-B Imax = 80mA
4	STO_FDBK-B	Internally connected to STO_FDBK-A when STO1+ and STO2+ are both high	From -36 to +36V differential voltage to STO_FDBK-A Imax = 80mA



IMPORTANT: STO-OUT and STO-IN (pin 7 and 14 on 14PINS I/O CONNECTOR) MUST be NOT CONNECTED when STO1+ and STO2+ (pin 1 and 2 on 4PINS STO CONNECTOR) are used.



2.3 Standard Wiring Diagrams



Note 2: Use "GND_ISO" for HW rev.C and later.

Figure 2.6: Standard wiring diagram to connect the Elife-Drive SR Series to your system -Multifeedback

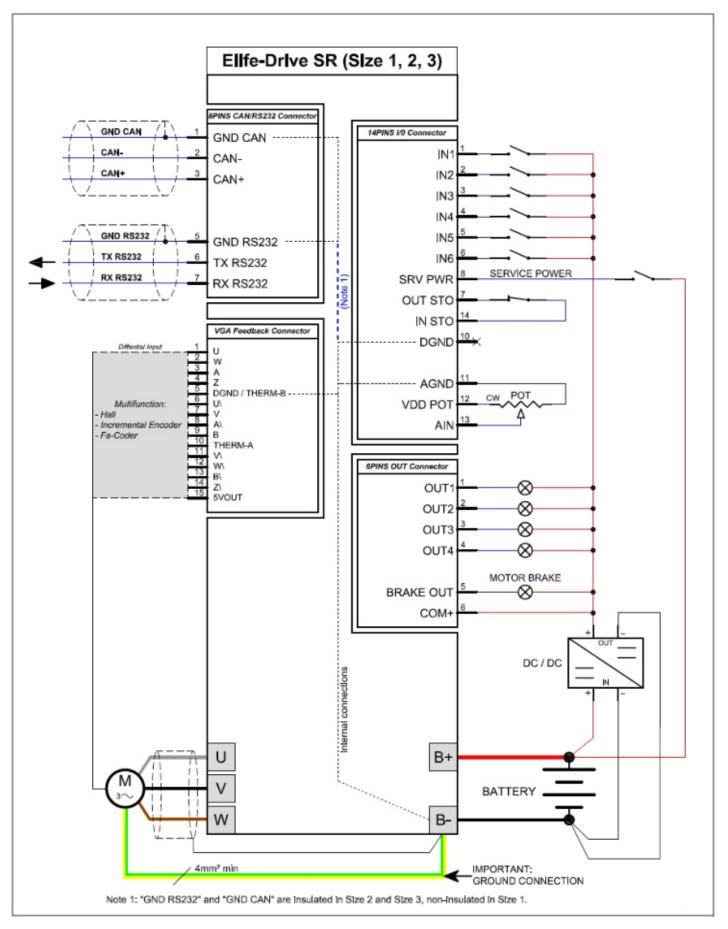


Figure 2.7: Standard wiring diagram to connect the Elife-Drive SR Series to your system - Differential Fa-Coder Feedback

Alternative wiring diagram for connecting the ground wire from the negative terminal of the converter to the metal frame of the motor.

This solution is used when it's not allowed to connect the potential of the battery to the metal frame of the vehicle, thus allowing the passage of by-pass of the disturbance frequencies caused by the high switched current flowing through the wire through the capacities in series with the wire internal phases of the motor.

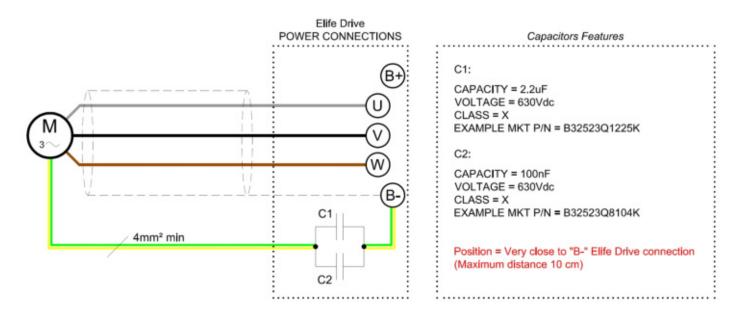


Figure 2.8: Alternative wiring diagram to connect the Ground Wire from the **Elife-Drive** to the Motor

2.3.1 Standalone Mode

The *Standalone* mode is divided into two specific functions, traction motor control and steering motor control.

The logic of this mode is to be able to drive the motor independently via the main inputs dedicated to the two specific functions.

Other optional inputs can be used to extend the functionality of these operating modes (See Table 2.3).

For the correct functioning of this operating mode, special attention must be paid to choose the correct value of *Analog Input* in according to the throttle characteristics.

🛃 Note

If you've installed a 0-5V throttle the rotation direction of the motor should be given through the FORWARD and the BACKWARD input.

When **throttle is put to neutral position** - before bridge activation - you can indicate the speed mode (FAST/SLOW input). (only for **Standalone Traction** Mode)

- Yor Tips and Advice

You can setup accurately the levels of your throttle in the **Configuration Standalone Tab**

The Standalone Traction Mode has a **Cruise Control**. The controller - when the Cruise Control is activated by a Rising Edge Signal on IN1 - reads the actual velocity and keeps this velocity stable also when the throttle is released. The Cruise Control is disabled by the following actions:

- A Rising Edge Signal on IN1
- If the Emergency Input is unsupplied.
- For any Alarm Occours.

 Table 2.3: Elife-Drive I/O definitions for Standalone Traction Mode

I/O Type	NAME	DESCRIPTION	
IN1	CRUISE	Rising Edge Signal = Enable/Disable Active or Disable the Cruise Control if a Rising Edge Signal is detected	Optional
IN2	FAST/SLOW	High =Fast mode, Low = Slow mode. This input is processed <i>only before</i> bridge activation	Optional ^b
IN3	FORWARD	High = Forward, Low = Stop (only if BACKWARD is low)	Optional ^a
IN4	BACKWARD	High = Backward, Low = Stop. This input is only processed if FORWARD input is low.	Optional ^a
IN5	EMERGENCY	Emergency input should always be supplied, otherwise Elife-Drive stops motor rotation and unlocks motor brake.	Mandatory
IN6	SLS	Safe Limited Speed High = maximum configured speed Low = limited speed	Optional
OUT1	BUZZER	It becomes active when the motor runs backwards It deactivates when the motor is running forwwards or stopped	
OUT2	STATUS	It gets steady high when motor is running and blinking when motor is stopped. It's low when there is an alarm.	
OUT3	ALARM	Alarm output, it changes its current state whenever an alarm is present.	
OUT4	SPEEDOMETER	rotation speed expressed in impulses/revolution	
	BRAKE OUT	It becomes active when the motor is stopped	Optional

^a **Mandatory** only for 0-5V throttle.

^b Mandatory if you want to switch between Fast and Slow mode.

The Fast and Slow modes are designed to meet two different purposes:

Slow mode It's programmable so that the vehicle indoor moves slowly with accurate operation.

Fast mode It allows a faster velocity for outdoor long distance path.

It's scheduled both the configuration of the maximum motor velocity and the maximum velocity at Slow mode

(See the Analog adjustment in Configuration Standalone parameters)

I/O Type	NAME	DESCRIPTION	
IN1	OVERTRAVEL CW	High = Active Overtravel for CW rotation, Low = Inactive Overtravel	Optional ^a
IN2	OVERTRAVEL CCW	High = Active Overtravel for CCW rotation, Low = Inactive Overtravel	Optional ^a
IN3	DIR	High = Clockwise, Low = Counterclockwise	Optional ^b
IN4	RUN / STOP	High = Run, Low = Stop	Mandatory
IN5	EMERGENCY	Emergency input should always be supplied, otherwise Elife-Drive stops motor rotation and unlocks motor brake.	Mandatory
IN6	SLS	Safe Limited Speed High = maximum configured speed Low = limited speed	Optional
OUT1			
OUT2			
OUT3	ALARM	Alarm output, it changes its current state whenever an alarm is present.	
OUT4	SPEEDOMETER	rotation speed expressed in impulses/revolution	
	BRAKE OUT	It becomes active when the motor is stopped	Optional

Table 2.4: Elife-Drive I/O definitions for Standalone Steering Mode

^a It is processed only if *overtravels* are enabled by Telemetry panel

^b **Mandatory** only for 0–10V or 0-5V throttle.

The table above shows the connections optimized for the Standalone Steering Mode

2.3.2 CANopen®Mode

In **CANopen[®]** mode you can control your motor through CANopen[®] bus protocol. For further information about CANopen[®] protocol, please refer to CiA[®] DSP402 protocol (version 3.0.1.15) and Elife-Drive CANopen[®] Manual.

A description of the inputs and outputs connections for this operating mode is shown in Table 2.5

In this operating mode is needed to set the correct CANopen[®] parameters via Telemetry Panel Configuration CANopen[®] section

I/O Type	NAME	DESCRIPTION	
IN1	M BWD It could be used as negative limit switch		Optional ^a
IN2	FWD	It could be used as positive limit switch	Optional ^a
IN3	HOME SENSOR	It could be used as home switch	Optional ^a
IN4			
IN5	EMERGENCY	Emergency input should always be supplied, otherwise Elife-Drive stops motor rotation and unlocks motor brake.	Mandatory
IN6	SLS	Safe Limited Speed High = maximum configured speed Low = limited speed	Optional
OUT1			
OUT2			
OUT3	ALARM	Alarm output, it changes its current state whenever an alarm is present.	
OUT4	SPEEDOMETER	rotation speed expressed in impulses/revolution	
	BRAKE OUT	It becomes active when the motor is stopped	Optional

Table 2.5: Elife-Drive I/O definitions for CANopen[®] Mode

^a It is processed only if CAN modes of operational is Homing Mode.

Please pay particular attention when wiring CANopen[®] connection: at both ends there must be a 120Ω resistor¹ and the bus length must be the following:

BIT RATE	BUS LENGTH
1 Mbit/s	up to 40 m
500 Kbit/s	up to 100 m
250 Kbit/s	up to 250 m

 $^{^{1}}$ the termination resistor is already set up inside the drive and can be activated in the appropriate configuration section

2.3.3 RS232 Mode

The RS232 Mode allows you to drive your motor via Telemetry Panel (See Chapter 3) or send the control commands² to the Elife-Drive through the RS232 protocol. This operating mode can be useful for testing your motor, without worrying about other devices (e.g: potentiometer) or other controllers (e.g: PLC) See Table 2.6 for a description of inputs and outputs.

I/O Type	NAME	DESCRIPTION	
IN1			
IN2			
IN3			
IN4			
IN5	EMERGENCY	Emergency input should always be supplied, otherwise Elife-Drive stops motor rotation and unlocks motor brake.	Mandatory
IN6	SLS	Safe Limited Speed High = maximum configured speed Low = limited speed	Optional
OUT1			
OUT2			
OUT3	ALARM	Alarm output, it changes its current state whenever an alarm is present.	
OUT4	SPEEDOMETER	rotation speed expressed in impulses/revolution	
	BRAKE OUT	It becomes active when the motor is stopped	Optional

Table 2.6: Elife-Drive I/O definitions for RS232 Mode

²For further information, see Elife-Drive - RS232 Communication Protocol document

2.3.4 EV Car Mode

Table 2.7: Elife-Drive SR I/O definitions for Ev Car Mode

I/O Түре	NAME	DESCRIPTION	
IN1	CRUISE	Rising Edge Signal = Enable/Disable Active or Disable the Cruise Control if a Rising Edge Signal is detected	Optional
IN2	SPORT / ECONOMY	High = Sport mode, Low = Economy mode. This input is processed <i>only before</i> bridge activation	Optional ^a
IN3	FORWARD	High = Forward, Low = Stop (only if BACKWARD is low)	Mandatory
IN4	BACKWARD	High = Backward, Low = Stop. This input is only processed if FORWARD input is low.	Mandatory
IN5	EMERGENCY	Emergency input should always be supplied, otherwise Elife-Drive stops motor rotation and unlocks motor brake.	Mandatory
IN6	HANDBRAKE	High = Unlocked, Low = Locked. This input is processed <i>only before</i> bridge activation	Optional
OUT1	BUZZER	It becomes active and deactivated alternately when the motor runs backward It is deactivated when the motor is running forwwards or stopped	
OUT2	STATUS	It gets steady high when motor is running and blinking when motor is stopped. It's low when there is an alarm.	
OUT3	ALARM	Alarm output, it changes its current state whenever an alarm is present.	
OUT4	BRAKE LIGHT	It is the output to connect to brake light, it gets high when velocity decreases of at least set value.	
	BRAKE OUT	It becomes active when the motor is stopped	Optional

^a Mandatory if you want to switch between SPORT and ECONOMY mode

The *EV* mode is specially designed to control motors mounted in Electric Vehicles (EV). This operating mode employs sophisticated proprietary algorithms to offer you a driving experience as much as possible similar to traditional gasoline engine vehicles.

For the correct functioning of this operating mode, you must install only 0–10V or 0-5V throttle and choose the correct value of *Analog Input* in according to the throttle characteristics.

🛃 Note

In this operating mode the rotation direction of the motor should be given through the FORWARD and the BACKWARD input. When **throttle is put to neutral position** - before bridge activation - you can indicate if the brake should be locked or unlocked (HANDBRAKE input), the rotation direction (BACKWARD or FORWARD) and the speed mode (SPORT/ECONOMY input).

The **SPORT** and **ECONOMY** modes are designed to meet two different purposes:

- **ECONOMY mode** This operating mode is specially designed in order to extend the battery life. The *acceleration ramp* is smoother than Sport Mode and the max power available is limited.
- **SPORT mode** The SPORT mode is designed to get the maximum performance as possible.

It's scheduled both the configuration of the maximum motor velocity and the maximum velocity at ECONOMY mode.

2.3.5 EV Bike Mode

NoteThis operating mode is reserved and unavailable

Monitoring Elife Drive

After wiring up correctly Elife-Drive and adjusting the programmable parameters , you are finally ready to test your system.

Warning

Before starting the test, you had better lift your vehicle up. The driving wheels must be off the ground and free to rotate. All testing and adjustment must be done in safe condition.

3.1 LED Diagnostics

Elife-Drive has an LED light on the front of the device that visually explains what the driver is doing. Below is the explanation of the different LED's status:

Blinking ORANGE Elife-Drive works correctly, motor is stopped

Blinking GREEN Elife-Drive works correctly, motor is running

Steady RED Elife-Drive detects one or more alarms. In this case, Elife-Drive stops motor rotation (disabling power relay and three-phase bridge) and unlocks motor brake.

Steady BLUE Elife-Drive is in the FW programming function, motor is stopped

If **CANopen[®]** mode is set, and the CANopen[®] FSA State is *Switch on disabled*, led will be **steady ORANGE** until it will receive shutdown command from PLC, independently from alarms or motor state.

3.2 Telemetry - Monitoring and Setting of Data

The telemetry panel allows you to set and view different types of telemetry data for each selected operating mode (Standalone, CANopen[®], RS232, Bike EV, Car EV).



Figure 3.1: Telemetry Panel displays a wide range of telemetry data and enables you to plot or log these data over time.

3.2.1 Motor Setting

Telemetry Motor Setting

onnection f						
		eters Configuration	ID drive Adjustments Lo	og Status		
otor Feed	dback					
ushless sy	ynchronous				 AC control 	
2		Motocooles		V	Max voltage	
50	Arms	Max Phase Current Durin	ng Torque Generation	- V	Boost Voltage	
0	Arms	Max Phase Current durin	ng regeneration	Hz	Max frequency	
100	Arms	S2 Maximum current		Hz	Min frequency	
3	8	S2 time	Brushless synchronous Bipolar brushed	Hz	Boost frequency	
50	Arms	Starting current	Monopolar brushed	Hz	Rated frequency	
	Arms	Field weakening current	Asynchronous Brushless synchronous	% per	s Max slippage	
	rpm	Field weakening max sp	beed	Hz/s		
	rpm	Field weakening min sp	eed			
	Nm	Motor max torque		Hz/s		
0,09	Nm/A	Torque constant	Gain flux reference		Bus voltage balance	
	V/1000 rpm	Ke	s Rotor time constant	(Lr/Rr)		
1000		 Temperature probe type 	9			
0	°C	Max. motor temperature			ge locked parameters	
		Phase Advance	None			
0	%A	Brake current reduction	Thermostat			
	V	Brake voltage	KTY84/130 KTY83/122			
		Motor brake in stop	PT1000			
	e Trational	vai S.r.I.	NTC10K KTY81/121 PT100			
Drive 2.4.8 b	by Elife Internation File Setup ?		KTY81/121 PT100			- 0
e-Drive 2.4.8 b ponnection f metry M	by Elife Internation File Setup ? Iotor Param		KTY81/121	ng Status		
e-Drive 2.4.8 b pannection f metry M tor Feed	by Elife Internation File Setup ? Iotor Param	eters Configuration	KTY81/121 PT100			
e-Drive 2.4.8 b onnection F metry M tor Feed ynchronou	by Elife Internation File Setup ? Iotor Param	eters Configuration	KTY81/121 PT100	ng Status V/F	AC control	
-Drive 2.4.8 b onnection F metry M tor Feed ynchronou 2	by Elife Internation File Setup ? Iotor Param dback us	Motor toys Motor toys	KTY81/121 PT100		AC control Max voltage	
Prive 24.8 b metry M for Feed mohronou 2 50	by Elife Internation File Setup ? lotor Param dback us Arms	Motor toys Motor toys Motor poles Max Phase Current Durin	KTY81/121 PT100	V/F	Max voltage	<u>va:</u>
Drive 2.4.8 b numetion F metry M tor Feed ynchronou 2 50 0	by Elife Internation File Setup ? lotor Param dback us Arms Arms	Motor toye Motor toye Motor poles Max Phase Current Durin Max Phase Current durin	KTY81/121 PT100	V/F 38,00 V	Max voltage	
Drive 2.4.8 b numetion F metry M tor Feed ynchronou 2 50 0 100	by Elife Internation File Setup ? Iotor Param diback us Arms Arms Arms	Motor toye Motor toye Motor poles Max Phase Current Durin Max Phase Current durin S2 Maximum Current	KTY81/121 PT100	V/F 38,00 V 2,00 V	Max voltage	V/I.
-Drive 2.4.8 b prinection F metry M tor Feed ynchronou 2 50 0 100 3	by Elife Internation File Setup ? Iotor Param diback us Arms Arms Arms S	Motor tpye Motor poles Max Phase Current Durin Max Phase Current durin S2 Maximum Current S2 time	KTY81/121 PT100 ID drive Adjustments Lo ng Torque Generation ng regeneration	V/F 38,00 V 2,00 V 100,00 Hz	Max voltage	V/I.
-Drive 2.4.8 b meeting M tor Feed ynchronou 2 50 0 100 3 50	by Elife Internation File Setup ? Iotor Param dback us Arms Arms S Arms S Arms	Motor tpye Motor poles Max Phase Current Durin Max Phase Current durin S2 Maximum current S2 time Starting current Bippo	KTY81/121 PT100 ID drive Adjustments Lo ng Torque Generation ng regeneration mchromous	V/F 38,00 V 2,00 V 100,00 Hz 3,75 Hz	Max voltage Boost Voltage Max frequency Min frequency	V/I.
Drive 2.4.8 b nnection f metry M for Feed mathematical 50 0 100 3 50	by Elife Internation File Setup ? Iotor Param dback us Arms Arms Arms S Arms Arms Arms Arms	Motor toye Motor toye Motor poles Max Phase Current Durin Max Phase Current durin S2 Maximum Current S2 time Starting current Field weakening Common Asyri	KTY81/121 PT100	V/F 38,00 V 2,00 V 100,00 Hz 3,75 Hz 3,75 Hz	Max voltage Boost Voltage Max frequency Min frequency Boost frequency Rated frequency	V/I.
Drive 2.4.8 b nnection F metry M Nor Feed ynchronou 2 50 0 100 3 50	by Elife Internation File Setup ? lotor Param dback us Arms Arms Arms s Arms Arms Arms rpm	Motor tpye Motor tpye Motor poles Max Phase Current Durin Max Phase Current Durin Max Phase Current durin S2 Maximum current S2 time Starling current Starling current Field weakening n Brus	KTY81/121 PT100 ID drive Adjustments Lo ng Torque Generation ng regeneration nchronous v blar brushed hopolar brushed hopolar brushed hochronous shless synchronous	V/F 38,00 V 2,00 V 100,00 Hz 3,75 Hz 3,75 Hz 50,00 Hz 5,1 % per	Max voltage Boost Voltage Max frequency Min frequency Boost frequency Rated frequency 3 s Max slippage	V/I.
Drive 2.4.8 b nnection F metry M tor Feed ynchronou 2 50 0 100 3 50	by Elife Internation File Setup ? lotor Param dback us Arms Arms Arms s Arms arms rpm	Motor tpye Motor tpye Motor poles Max Phase Current Durin Max Phase Current durin S2 Maximum Current S2 time Starting current S2 time Starting current Field weakening c Field weakening n Brus Field weakening min sp	KTY81/121 PT100 ID drive Adjustments Lo ng Torque Generation ng regeneration nchronous v blar brushed hopolar brushed hopolar brushed hochronous shless synchronous	V/F 38,00 V 2,00 V 100,00 Hz 3,75 Hz 3,75 Hz 50,00 Hz 5,1 % per 100 Hz/s	Max voltage Boost Voltage Max frequency Min frequency Boost frequency Rated frequency 3 s Max slippage Up slope	V/I.
Porive 24.8 b prinection F metry M tor Feed ynchronou 2 50 0 100 3 50	by Elife Internation File Setup ? Iotor Param dback us Arms Arms Arms s Arms Arms rpm rpm Nm	Motor tpye Motor tpye Motor tpye Motor poles Max Phase Current Durin Max Phase Current durin S2 Maximum current S2 time Starting current Field weakening n Field weakening n Field weakening n spi Motor max torque	KTY81/121 PT100	V/F 38,00 V 2,00 V 100,00 Hz 3,75 Hz 3,75 Hz 50,00 Hz 5,1 % per 100 Hz/s 50 Hz/s	Max voltage Boost Voltage Max frequency Min frequency Boost frequency Rated frequency 3 s Max slippage Up slope Down slope	V/I.
-Drive 2.4.8 b nmettion F metry M lor Feed ynchronou 2 50 0 100 3 50	by Elife Internation File Setup ? Iotor Param dback us Arms Arms Arms Arms s Arms arms rpm rpm Nm Nm/A	Motor toyse Motor toyse Motor toyse Motor toyse Max Phase Current Durin Max Phase Current durin S2 Maximum Current S2 time Starting current Field weakening n Max Field weakening n Brua Field weakening n	KTY81/121 PT100	V/F 38,00 V 2,00 V 100,00 Hz 3,75 Hz 3,75 Hz 50,00 Hz 5,1 % per 100 Hz/s 50 Hz/s	Max voltage Boost Voltage Max frequency Min frequency Boost frequency Rated frequency 3 s Max slippage Up slope	V/I.
-Drive 2.4.8 b nmettion F metry M tor Feed ynchronou 2 50 0 100 3 50	by Elife Internation File Setup ? Iotor Param dback us Arms Arms Arms s Arms s Arms rpm rpm rpm Nm Nm/A V/1000 rpm	Motor toye Motor toye Max Phase Current Durin Max Phase Current Durin Max Phase Current durin S2 Maximum Current S2 time Starting current S2 time Field weakening n Field weakening n Field weakening n Field weakening n Field weakening n Field weakening n Starting current Ke	KTY81/121 PT100 ID drive Adjustments Lo ng Torque Generation ng regeneration hothronous shless synchronous shless synchronous eed Gain flux reference s Rotor time constant	V/F 38,00 V 2,00 V 100,00 Hz 3,75 Hz 3,75 Hz 50,00 Hz 5,1 % per 100 Hz/s 50 Hz/s	Max voltage Boost Voltage Max frequency Min frequency Boost frequency Rated frequency 3 s Max slippage Up slope Down slope	V/I.
Prive 2.4.8 b prinection of metry M lor Feed ynchronou 2 50 0 100 3 50	by Elife Internation File Setup ? Iotor Param dback us Arms Arms Arms Arms Arms Arms rpm rpm rpm Nm Nm Nm/A V/1000 rpm	Motor toye Motor toye Max Phase Current Durin Max Phase Current Durin Max Phase Current durin S2 Maximum Current S2 time Starting current S2 time Field weakening n Field weakening n Field weakening n Field weakening n Field weakening n Field weakening n Starting current Ke	KTY81/121 PT100 ID drive Adjustments Lo ng Torque Generation ng regeneration hothronous shless synchronous shless synchronous eed Gain flux reference s Rotor time constant	V/F 38,00 V 2,00 V 100,00 Hz 3,75 Hz 3,75 Hz 50,00 Hz 5,1 % per 100 Hz/s 50 Hz/s (Lr/Rr)	Max voltage Boost Voltage Max frequency Min frequency Boost frequency Rated frequency 3 s Max slippage Up slope Down slope Bus voltage balance	V/I.
Porive 2.4.8 b prinection of metry M tor Feed ynchronou 2 50 0 100 3 50	by Elife Internation File Setup ? Iotor Param dback us Arms Arms Arms s Arms s Arms rpm rpm rpm Nm Nm/A V/1000 rpm	Motor toye Motor toye Max Phase Current Durin Max Phase Current Durin Max Phase Current durin S2 Maximum current S2 Ime Starling current S2 Ime Field weakening chasy Field weakening n Brus Field weakening n Brus	KTY81/121 PT100 ID drive Adjustments Local ng Torque Generation ng regeneration ng regeneration nchronous shless synchronous eed Gain flux reference s Rotor time constant	V/F 38,00 V 2,00 V 100,00 Hz 3,75 Hz 3,75 Hz 50,00 Hz 5,1 % per 100 Hz/s 50 Hz/s (Lr/Rr)	Max voltage Boost Voltage Max frequency Min frequency Boost frequency Rated frequency 3 s Max slippage Up slope Down slope	V/I.
Porrive 2.4.8 b primetry M tor Feed ynchronou 2 50 0 100 3 50 100 3 50	by Elife Internation File Setup ? Iotor Param dback us Arms Arms Arms Arms s Arms Arms rpm rpm Nm Nm Nm/A V/1000 rpm	Motor toyse Motor toyse Motor poles Max Phase Current Durin Max Phase Current durin S2 Maximum current S2 time Starting current Field weakening c Motor max torque Torque constant Ke - Lemperature probe type Max. motor temperature Phase Advance	KTY81/121 PT100 ID drive Adjustments Lo ng Torque Generation ng regeneration hothronous shless synchronous shless synchronous eed Gain flux reference s Rotor time constant	V/F 38,00 V 2,00 V 100,00 Hz 3,75 Hz 3,75 Hz 50,00 Hz 5,1 % per 100 Hz/s 50 Hz/s (Lr/Rr)	Max voltage Boost Voltage Max frequency Min frequency Boost frequency Rated frequency 3 s Max slippage Up slope Down slope Bus voltage balance	V/I.
Porrive 2.4.8 b primetry M tor Feed ynchronou 2 50 0 100 3 50 100 3 50	by Elife Internation File Setup ? Iotor Param dback us Arms Arms Arms Arms Arms Arms rpm rpm rpm Nm Nm/A V/1000 rpm	Motor toyse Motor toyse Motor toyse Motor toyse Max Phase Current Durin Max Phase Current durin S2 time S2 time Field weakening charmer Field weakening min spi Motor max torque Torque constant Ke Camperature probe type Max. motor temperature Phase Advance Brake current reduction	KTY81/121 PT100 ID drive Adjustments Lo ng Torque Generation ng regeneration nchronous shless synchronous eed Gain flux reference s P11000 None Thermostat	V/F 38,00 V 2,00 V 100,00 Hz 3,75 Hz 3,75 Hz 50,00 Hz 5,1 % per 100 Hz/s 50 Hz/s (Lr/Rr)	Max voltage Boost Voltage Max frequency Min frequency Boost frequency Rated frequency 3 s Max slippage Up slope Down slope Bus voltage balance	V/I.
e-Drive 2.4.8 b onnection F metry M tor Feed ynchronou 2 50 0 100 3 50	by Elife Internation File Setup ? Iotor Param dback us Arms Arms Arms Arms s Arms Arms rpm rpm Nm Nm Nm/A V/1000 rpm	Motor toyse Motor toyse Motor poles Max Phase Current Durin Max Phase Current durin S2 Maximum current S2 time Starting current Field weakening c Motor max torque Torque constant Ke - Lemperature probe type Max. motor temperature Phase Advance	KTY81/121 PT100 ID drive Adjustments Lo ng Torque Generation ng regeneration ng regeneration nchronous viar brushed nochronous shless synchronous eed Sain flux reference s Rotor time constant e	V/F 38,00 V 2,00 V 100,00 Hz 3,75 Hz 3,75 Hz 50,00 Hz 5,1 % per 100 Hz/s 50 Hz/s (Lr/Rr)	Max voltage Boost Voltage Max frequency Min frequency Boost frequency Rated frequency 3 s Max slippage Up slope Down slope Bus voltage balance	V/I.

Figure 3.2: Telemetry Panel displays the Motor Parameters

3.2.2 Feedback Setting

Telemetry Motor Feedback Setting

All of our drives have the ability to interface with different types of Feedback sensors, in some models you can have multiple feedback interfaces at the same time, while other models only have one possible interface and must be explicitly requested when ordering.

Hall Sensors are devices that exploit the Hall effect, which is the change in an electrical voltage in the presence of a magnetic field. Hall sensors are used to detect the position of the rotor of an electric motor, particularly a brushless motor, which has permanent magnets on the rotor. Hall sensors are placed on the stator, at the electrical phases, and generate digital signals that change state when the rotor passes in front of them. These signals are used to switch the electrical phases and keep the motor in synchronism.

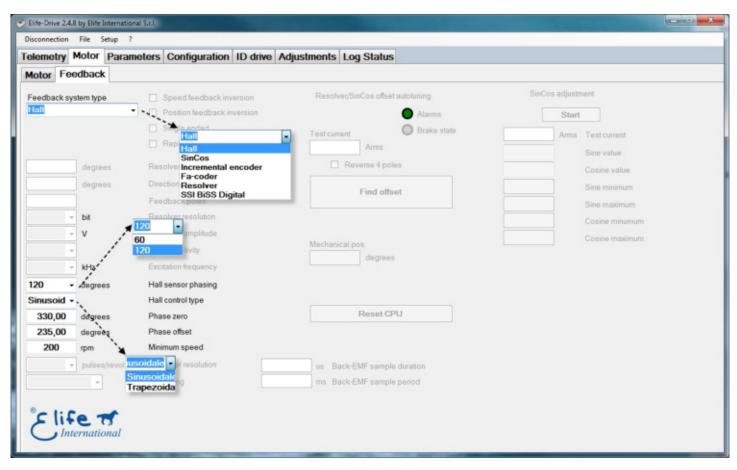
SinCos is a type of incremental encoder, that is, a device that generates electrical signals proportional to the angular displacement of the rotor of an electric motor. Unlike conventional incremental encoders, which generate digital signals in the shape of a square wave, SinCos encoders generate analog signals in the shape of a sine and cosine wave, offset from each other by 90 degrees. These signals can be processed by an electronic circuit to achieve higher resolution and greater noise immunity.

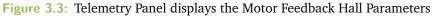
Incremental Encoder is a device that generates electrical signals proportional to the angular displacement of the rotor of an electric motor. An incremental encoder consists of an optical or magnetic disk, which has alternating lines or poles, and an optical or magnetic sensor, which detects the passage of the lines or poles. The incremental encoder generates two digital signals in the shape of a square wave, offset from each other by 90 degrees, called channel A and channel B. The number of pulses per revolution determines the resolution of the encoder. In addition, the incremental encoder can have a third signal, called the Z or index channel, which generates one pulse per revolution and serves as the zero reference.

Fa-Coder is a type of incremental encoder, patented by Tamagawa Seiki, that is based on the principle of frequency modulation. A Fa-Coder consists of an optical disk, which has concentric lines with a variable frequency, and an optical sensor, which detects the passage of the lines. The Fa-Coder generates two analog signals in the form of a sine and cosine wave, 90 degrees out of phase with each other, with a frequency proportional to the angular speed of the rotor. These signals can be converted to digital signals in the form of a square wave, with a resolution equal to the number of lines on the disk.

Resolver is a device that generates electrical signals proportional to the absolute angular position of the rotor of an electric motor. A resolver consists of a rotor, which has a coil energized by an alternating voltage, and a stator, which has two orthogonal coils that sense the voltage induced by the rotor. The resolver generates two analog signals in the form of a sine and cosine wave, 90 degrees out of phase with each other, with an amplitude proportional to the position of the rotor. These signals can be converted into a serial digital signal with a resolution equal to the number of bits of the converter.

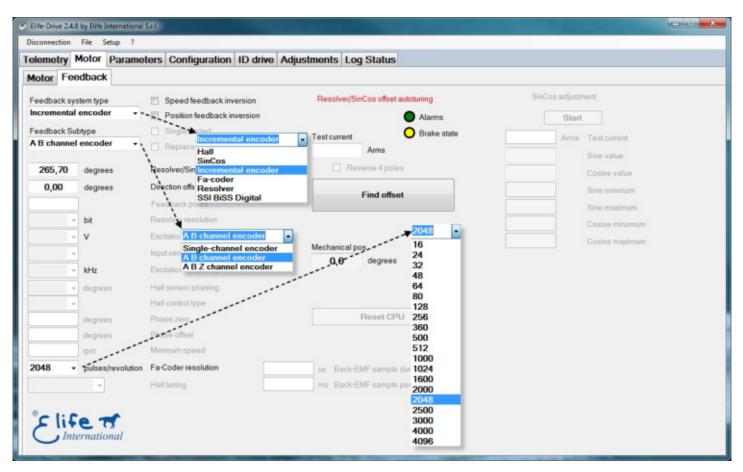
Absolute encoder SSI/BiSS is a device that generates electrical signals that uniquely identify the angular position of the rotor of an electric motor. An absolute encoder consists of an optical or magnetic disk, which has lines or poles coded in binary, and an optical or magnetic sensor, which detects the code of the lines or poles. The absolute encoder generates a serial digital signal, which transmits the position code in binary format. The number of bits in the code determines the resolution of the encoder. There are several serial communication protocols for absolute encoders, including SSI (Synchronous Serial Interface) and BiSS (Bidirectional Serial Synchronous Interface).





Motor Fe		eters Configuratio	n ID drive Adjustm	ients Log	Status			
						0-0-	s adjustn	
Feedback sy SinCos		Speed feedback		Resolver/Sin	Cos offset autotuning	Sinco		
Silicoa		Position feedback	inversion		Alarms		Start	
		C Gingle ended	Ţ	est current	O Brake state	10	Arms	Test current
		Replacement		10	Arms	2455		Sine value
66,85	degrees	Resolver/SinCos offse	SinCos	Rev	erse 4 poles	2301		Cosine value
0,00	degrees	Direction offset	Hall		Find offset	1457		Sine minimum
2		Feedback poles	SinCos Incremental encoder		ring onset	2682		Sine maximum
	bit	Resolver resolution	Fa-coder Resolver			1446		Cosine minumum
	v	Excitation amplitude	SSI BiSS Digital			2669		Cosine maximum
	-	Input sensitivity	M	echanical po 279,3	s. degrees			
	kHz	Excitation frequency		2/9,5	oediees			
	degrees	Hall sensor phasing						
	-	Hall control type						
	degrees	Phase zero			Reset CPU			
	degrees	Phase offset						
	rpm	Minimum speed						
	pulses/revolutio	n Fa-Coder resolution		us Back-El	MF sample duration			
	-	Hall tuning		ms Back-El	MF sample period			

Figure 3.4: Telemetry Panel displays the Motor Feedback SinCos Parameters





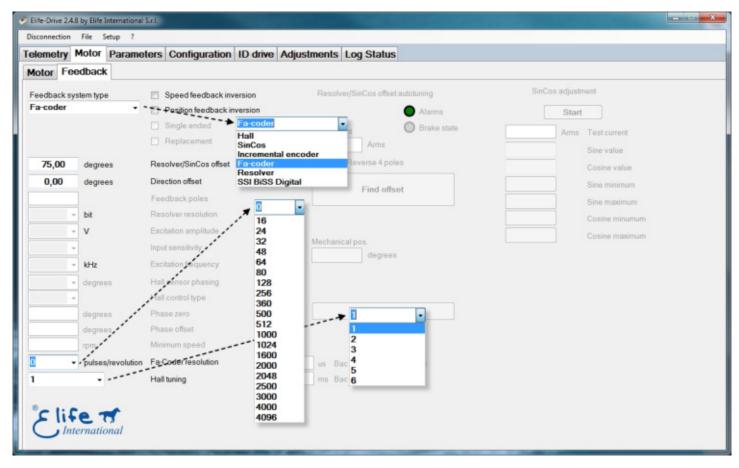
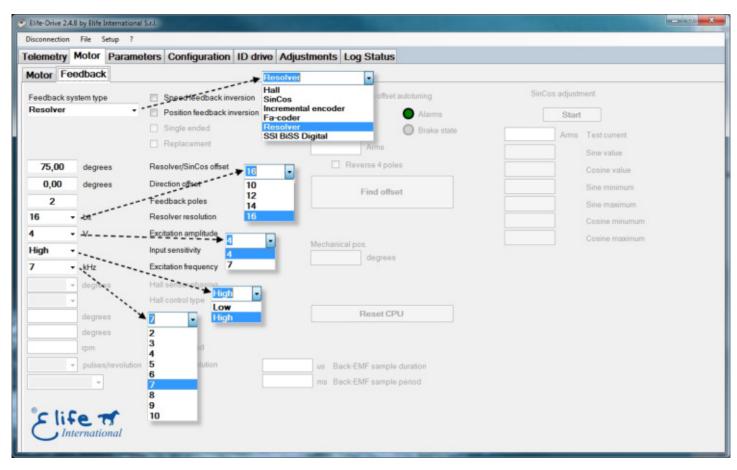
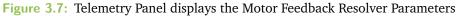


Figure 3.6: Telemetry Panel displays the Motor Feedback FaCoder Parameters





otor Fee	edback	SSI BiSS Digital	•	
edback sy		-Speed Hall	Resolver/SinCos offset autotuning	SinCos adjustment
SI BiSS Di	gital • *	Position SinCos Incremental encoder	Alarms	Start
edback Su		Single (Fa-coder Resolver	Test current O Brake state	Arms Test current
life SSI 60	k rpm •	Replac SSI BiSS Digital	10 Arms	Sine value
262,49	degrees	Resolver/SinCos offset	Reverse 4 poles	Cosine value
0,00	degrees	Direction offset		Sine minimum
2		Feed	Find offset	Sine maximum
	bit	Reso Elife SSI 60k rpm Reso Elife SSI 60k rpm M.turn		Cosine minumum
	v	RLS SSI standard Excite RLS SSI standard M.turn		Cosine maximum
		BiSS standard Input: BiSS standard M.turn	Mechanical pos.	Cosine maximum
	kHz	Excitation frequency	175,6 degrees	
	degrees	Hall sensor phasing		
		Hall control type		
	degrees	Phase zero	Reset CPU	
	degrees	Phase offset		
	rpm	Minimum speed		
	pulses/revolution	Fa-Coder resolution	us Back-EMF sample duration	
	*	Hall tuning	ms Back-EMF sample period	

Figure 3.8: Telemetry Panel displays the Motor Fedback Absolute Encoder SSI Parameters

3.2.3 System Parameters

Telemetry System Parameters

elemetry	Motor	Parameters Configuration ID drive Adjustments Log Status	
inear Rar	пр	Slope type 100 ms Emergency input filter Up slope 50 ms Digital inputs filter Down slope 50 ms Digital inputs filter	
50000	rpm/s	Up slope 50 ms Digital inputs filter	
10000	rpm/s		
		Emergency slope enable	
50000	rpm*s	Emergency slope Ramp Jerk (S)	
3	s	Following error delay	
80	.с	Max. drive temperature	
	w	Power control	
ower		N.H. alarm output	
		Brake fault alarm	
		Supply fault alarm	
		Low battery dynamics decrease	
47,5	v	Voltage Limit Speed Reduction = SLS (for Low to Low Battery)	
42,3	v	Voltage Limit Stop for Under Voltage (for Fully discharged Battery)	
		Emergency input fault	
		Position control at zero RPM	
°c tu	Ce 1	Direction forcing None Forward only Backward only	

Figure 3.9: Telemetry Panel displays the System Parameters

3.2.4 Configuration - Connection

Telemetry Connection Configuration

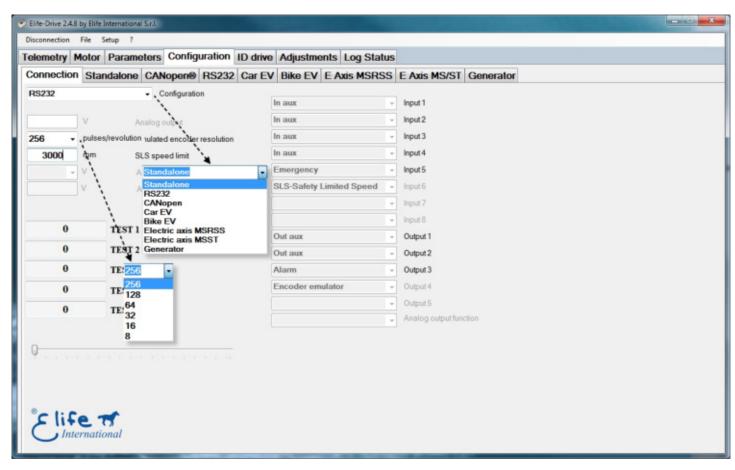


Figure 3.10: Telemetry Panel Connection Configuration

3.2.5 Configuration - Standalone

Telemetry Standalone Configuration

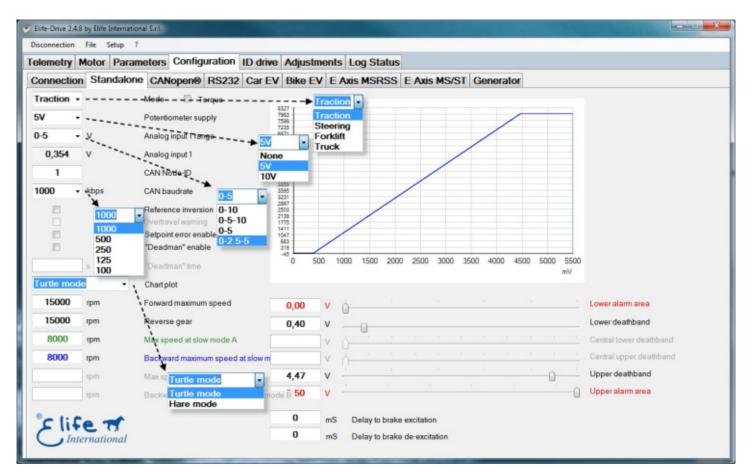


Figure 3.11: Telemetry Panel displays the Standalone Configuration

3.2.6 Configuration - CANopen®

Telemetry CANopen[®] Configuration

Connection	Standak	one CA	Nopen®	RS232	Car EV	Bike EV	E Axis	MSRSS	E Axis MS/S	T Generator	
255			TPD02 tran	smission h	pe			1	-	Position resolution	
255			RPD02 tran	nsmission t	/pe					Following tolerance	
1			Node-ID						ARMS/s	Torque slope	
1000 -	Kbps		CAN baudr	ate						Homing method	
			MASTER						rpm	Speed during search for switch	
	1000		Size indicat	or					rpm/s	Homing acceleration	
	500		Termination	n resistor					mm	Home offset	
15000	rpm 250	_	Motor maxin	num speed	l)						
	1		Position fee	dback type	6						
	pulses/revo	lution	Encoder res	solution							
			Mechanical	reducer							
0x00			CANopen®	Controlwor	d						
0x260			CANopen®	Statusword	1						
Switch	on disable	ed	CANopen®	FSA state							
Profile	elocity mo	ode	CANopen®	operationa	Imode						

Figure 3.12: Telemetry Panel displays the CANopen[®] Configuration

3.2.7 Configuration - RS232

Telemetry RS232 Configuration

Elife-Drive 2.4.1 Disconnection	-		S.r.l.								
			ters Config	uration	ID drive	Adjustm	ents Log Sta	tus			
Connection	n Star	ndalone	CANopen®	RS232	Car EV	Bike EV	E Axis MSR	SS E Axis	MS/ST	Generator	
Speed •	•••		Mode								
15000	rpm	Speed	Motor max	imum spee	d						
	Arms	Speed	Max. moto	rcurrent							
	Nm	Torque	Motor max	torque							
	Arms/	8	Slope								
0	rpm		Motor Spe	ed							
0,00	Arms		Motor curre	ent							
۽ الع	ernatio	onal									

Figure 3.13: Telemetry Panel displays the RS232 Configuration

3.2.8 Configuration - EV CAR

Telemetry EV Car Configuration

elemetry M	lotor	Paramet	ters Config	uration	ID drive	Adjustmer	ts Log Status	3		
Connection	Star	ndalone	CANopen®	RS232	Car EV	Bike EV	E Axis MSRSS	E Axis MS/ST	Generator	
58	Arms	R	ated braking cu	rent						
16	Arms	Sk	ope threshold			0	Arms	Torque demand		
0,0	ms	Fa	ast slope			0	Arms	Motor current		
41,6	ms	SI	ow slope			0,00	v	Throttle		
0,00	v	Vo	oltage Level			12800	rpm	Motor Speed		
0,00	v	M	AX Charge							
0,0	v	V	Up Limit							
0,0	v	VI	Dw Limit			Chang	e locked parame	eters		
0,0		R	otation limiter Kp	6						
0		R	otation limiter Ki							
0	kW	M	aximum power							
0	kW	M	aximum braking	power						
0	rpm	Fo	orward maximun	speed						
0	rpm	Ma	ax speed at slov	wmode						
0	rpm	Re	everse gear							
0-10 +	v	An	nalog input 1 ran	ge						
V	1	Di	rection inversion	1						
	्रे	Le	ever inversion							
		0-10	•							
		0-10 0-5								
		0-5								

Figure 3.14: Telemetry Panel EV Car Configuration

3.2.9 Configuration - EV BIKE

Telemetry EV Bike Configuration

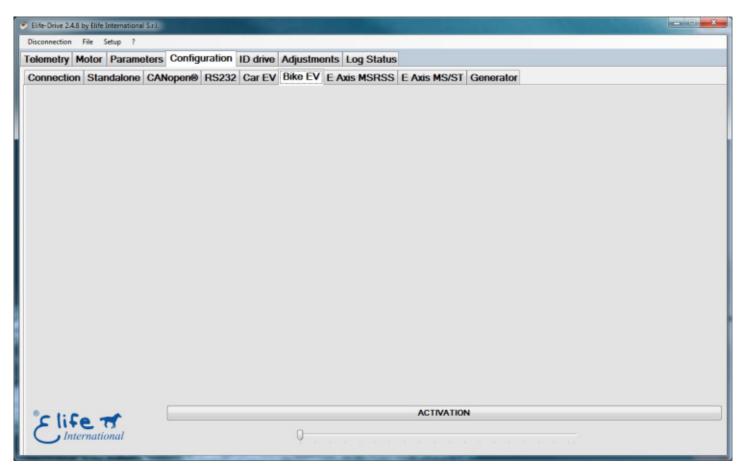


Figure 3.15: Telemetry Panel EV Bike Configuration

3.2.10 Configuration - E Axis MSRSS

Telemetry E Axis MSRSS Configuration

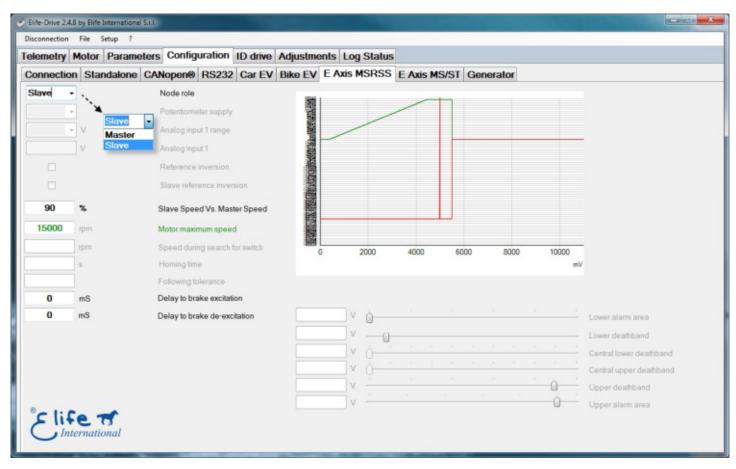


Figure 3.16: Telemetry Panel E Axis MSRSS Configuration

3.2.11 Configuration - E Axis MS/ST

Telemetry E Axis MS/ST Configuration

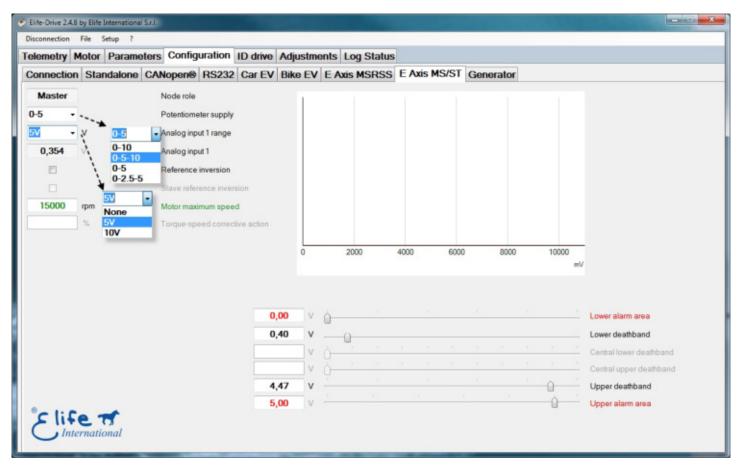


Figure 3.17: Telemetry Panel E Axis MS/ST Configuration

3.2.12 Configuration - Generator

Telemetry Generator

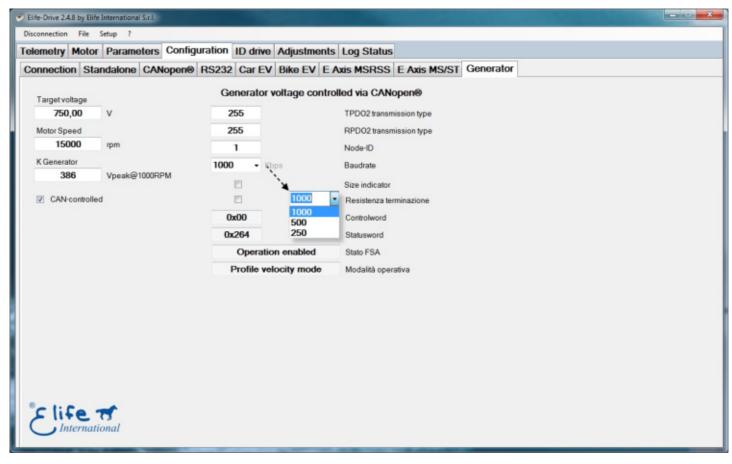


Figure 3.18: Telemetry Panel Generator Configuration

3.2.13 ID Drive

Telemetry ID Drive

Elife-Drive 2.4	8 by Elife	International S.r.I.					
Disconnection							
Felemetry	Motor	Parameters	s Configuration	ID drive	Adjustments	Log Status	
7.8	Firmwa	are version					
1	Hardw	are version					
263	Custon	ner code					
0	Serial	number					
ZELED486	00x241	1234 VIN dec	oder Setting				
المالي الم	e	5					

Figure 3.19: Telemetry Panel displays the ID Drive

3.2.14 Adjustments

Telemetry Adjustments

Hz Speed read frequency Hz Voltage loop frequency Hz Current loop frequency Voltage loop Kp 11 Voltage loop Ki 18 Voltage loop Kd 0 Voltage loop Kd 0 Current loop Kp 7 Current loop Ki 11 In current loop Kp 11 Position loop Kp 11 Position loop Ki Position loop Ki scaler
Hz Current loop frequency Voltage loop Kp 11 Voltage loop Ki 18 Voltage loop Kd 0 Voltage loop Kd 0 Voltage loop Kp 7 Current loop Kp 7 Current loop Ki 11 Iq current loop Kp 11 Position loop Kp Position loop Kp scaler Position loop Ki 11 Position loop Ki Position loop Ki scaler
Voltage loop Kp 11 Voltage loop Kp scaler Voltage loop Ki 18 Voltage loop Ki scaler Voltage loop Kd 0 Voltage loop Kd scaler Current loop Kp 7 Iq current loop Kp scaler Current loop Ki 11 Iq current loop Ki scaler Position loop Kp Position loop Kp scaler Position loop Ki 11 Iq current loop Ki scaler
Voltage loop Ki 18 Voltage loop Ki scaler Voltage loop Kd 0 Voltage loop Ki scaler Current loop Kp 7 Iq current loop Kp scaler Current loop Ki 11 Iq current loop Ki scaler Position loop Kp Position loop Kp scaler Position loop Ki 1 Position loop Ki scaler
Voltage loop Kd 0 Voltage loop Kd scaler Current loop Kp 7 Iq current loop Kp scaler Current loop Ki 11 Iq current loop Ki scaler Position loop Kp Position loop Kp scaler Position loop Ki Position loop Ki scaler
Current loop Kp 7 Iq current loop Kp scaler Current loop Ki 11 Iq current loop Ki scaler Position loop Kp Position loop Kp scaler Position loop Ki Position loop Ki scaler
Current loop Ki 11 Iq current loop Ki scaler Position loop Kp Position loop Kp scaler Position loop Ki Position loop Ki scaler
Position loop Kp Position loop Kp scaler Position loop Ki Position loop Ki scaler
Position loop Ki Position loop Ki scaler
Position loop Kd Position loop Kd scaler
Adjustment class
Native class
1 Change locked parameters
2 3
4
ent

Figure 3.20: Telemetry Panel Adjustments

3.2.15 Log Status

Telemetry Log Status

slemetry	Motor	Parameters	Configuration	ID drive	Adjustments	Log Stat	us			
0	ARMS	U phase current	t				Alarms	Digita		
0	ARMS	V phase current	L.			-	Configuration	0	Input 1	
0	ARMS	W phase curren	vt.			-	Following	0	Input 2	
0,00	degrees	Mechanical pos	R.				Drive overtemperature	0	Input 3	
0		Direct current se	atroint			-	Feedback	0	Input 4	
0		Direct current				-	Overcurrent	0	Input 5	
0						_	Emergency input Overvoltage	0	Input 6	
-		Quadrature cum				-	Setpoint error	õ	Input 7	
0		Quadrature cum	ent			-	Analogic interruption		Input 8	
0		Direct voltage					Motor temperature	0	mipur o	
0		Quadrature volta	age			-	Safety			
0,00	v	Bus voltage				-	Stalled rotor			
0		Resolver error n	number			•	Undervoltage			
0,000	v	Analog input 1				•	Communication timeout			
		Direct current				•	Other			
		Quadrature curr	ent							
		Direct voltage								
		Quadrature volt								
			age							
		Motor voltage								
8- 1. I	e T									

Figure 3.21: Telemetry Panel displays the Log Status

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