MICROPHASE
Technology & Performance

Mini Traction Power

Service Manual

Declaration of conformity

> **BLDC SERVODRIVES**
>
> Product name: Mini Traction Power

Manufacturer: MICROPHASE s.r.l.

Address: Via Palladio 23
            36051 Creazzo (VI) Italy

MICROPHASE s.r.l assures that the drives listed above meet the following European Norms Standard:

in accordance with EC Directive 2014/30/EU (EMC Directive)

EN 55022, EN 61000-4-2

in accordance with EC Directive 2014/35/EU (Low Voltage Directive))

EN 61010-1

WARNING - Risk of damage and/or personal injury

This drives doesn't contain any user serviceable part. Attempting to replace any internal component, may result in damage to the unit and/or personal injury. This may also avoid the warranty.

Print in Italy rev. 08/2024

Index

1.0   Model and size

MODEL & TYPE				
RATED VOLTAGE type	V	**Model 24**	**Model 48**	**Model 60**
MINIMUM VOLTAGE	V	18	20	20
MAXIMUM VOLTAGE ADMITTED	V	32	80	90
BOOST CURRENT (5s)	A	120@5s	120@5s	120@5s
PEAK CURRENT (2 Min)	A	100@2min	100@2min	100@2min
RATED CURRENT	A	75	75	75
RATED OUTPUT POWER	kW	1,8	3,6	4,5
DEFAULT PWM FREQUENCY	KHz	20		
	°C	0°C +40°C		

TECNICAL DATA CHARACTERISTICS	
Supply voltage output	0,9 Vdc Input
PWM frequency	20Khz
Operating temperature	0/+45°C
Storage temperature	-10/+70°C
Power supply output (+5V)	+5Vdc max 200 mA
Band width (current)	2KHz
Band width (velocity)	150Hz
Minimum Inductance motor	200uH
Weight	0,5kg
Contaminants	2° or better (Norms EN60204 e EN50178)
Altitude	Up to 1000m without restrictions, from 1000 to 2000m power derating 1,5%/100m
Flammability rating 94V-0	The PCB and the electronic component meet 94V-0

1.1   View product

C1   Motor feedback
C2   I/O - CanOpen
C3   Serial communication
+ / -   DC Power Supply (M5 pitch screw)
U - V - W   Phase Motor (M5 pitch screw)
Brake Output (M4 pitch screw)
(Led)   Status Led
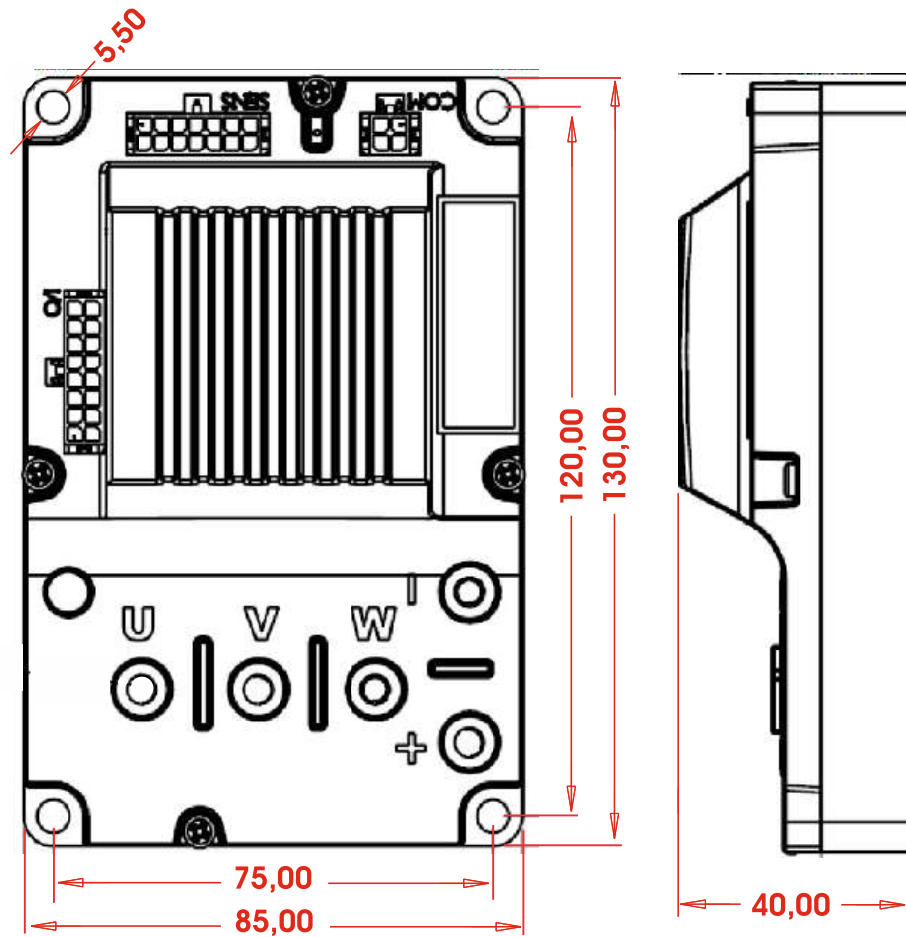

1.2   Control and I/O

This drive is full digitally controlled. It can be run in different modes, with or without feedback sensor. It can be drive DC Brushless motor, AC Brushless motor and Asinchronous motors.

- 2 analog inputs
- 1 Can Bus interface
- 2 RS232 for setup and debug
- 3 temperature sensor
- 1 motor temperature input
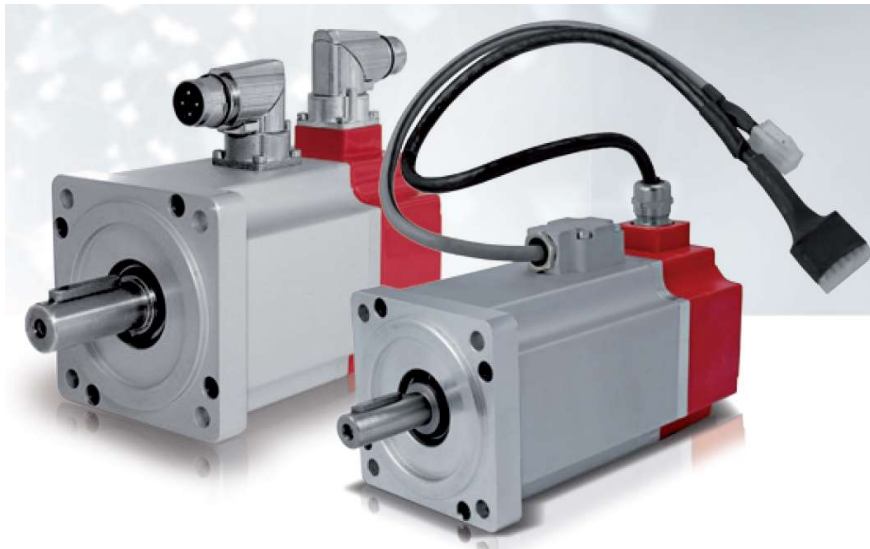- 1 inclinometer

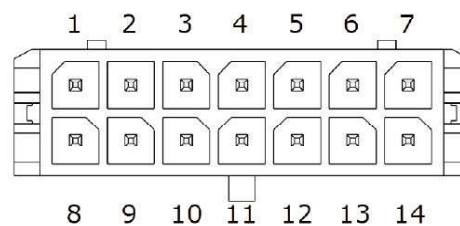## 1.3   Mechanical dimensions

Dimensions in mm

2.0   Feedback available

The Mini Traction Drive converter can be combined with the following speed feedbacks.
- 17bit absolute single turn serial encoder (4 wires)
- Facoder (Hall cells + encoder)
- Hall sensors only
- Sin - cos encoder 1Vpp
- Resolver

The C1 connector (Mini Traction Power) is unique for the various feedback versions. The connections for each feedback version are highlighted

Motor Feedback Connector C1

The Mini Traction drive is delivered with the relevant connection datasheet for the chosen brushless motor.

2.1 Smart serial encoder feedback

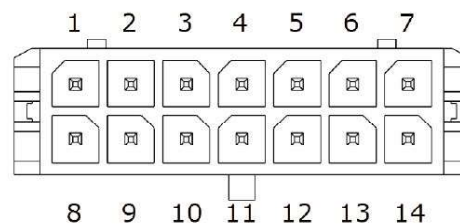The table below highlights the connections for the 4-wire serial encoder

I/O CONNECTOR C1		
2	**5V**	Output supply 5V@300mA
3	**GND**	GND Zero signals
4	**DATA -**	-485 SmartABS serial encoder
5	**DATA +**	+485 of SmartABS serial encoder

2.2 Resolver feedback

The table below highlights the connections for the 6-wire resolver feedback

I/O CONNECTOR C1		
1	**HV**	Hall sensor V input
2	**5V**	Output supply 5V@300mA
3	**GND**	GND Zero signals
4	**-**	-
5	**-**	-
6	**RES OUT**	Resolver sinusoidal output
7	**GND**	GND Zero signals
8	**-**	-
9	**-**	-
10	**/RES_SIN**	inv. Resolver sinus input
11	**RES_SIN**	Resolver sinus input
12	**/RES_COS**	inv. Resolver cosinus input
13	**RES_COS**	Resolver cosinus input
14	**STM**	Motor thermal sensor

The C1 connector (Mini Traction Power) is unique for the various feedback versions. The connections for each feedback version are highlighted
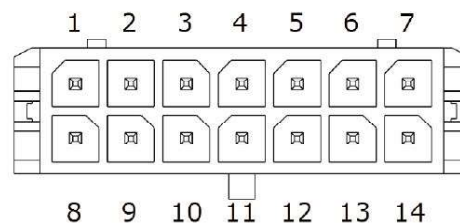

Motor Feedback Connector C1

2.3   Encoder + Hall feedback

The table below highlights the connections for the encoder + hall feedback

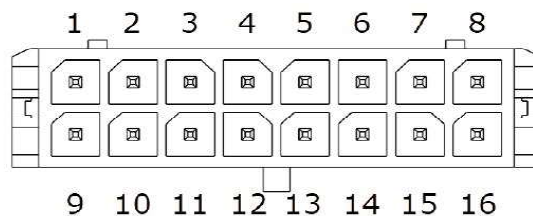| I/O CONNECTOR C1		
1	HV	Hall sensor V input
2	5V	Output supply 5V@300mA
3	GND	GND Zero signals
4	CHZ-	Inverted Z channel encoder input
5	CHZ+	Z channel encoder input
6	-	-
7	GND	GND Zero signals
8	HU	Hall sensor U input
9	HW	Hall sensor W input
10	CHB-	Inverted B channel encoder input
11	CHA+	A channel encoder input
12	CHA-	Inverted A channel encoder input
13	CHB+	B channel encoder input
14	STM	Motor thermal sensor

The C1 connector (Mini Traction Power) is unique for the various feedback versions. The connections for each feedback version are highlighted

Motor Feedback Connector C1
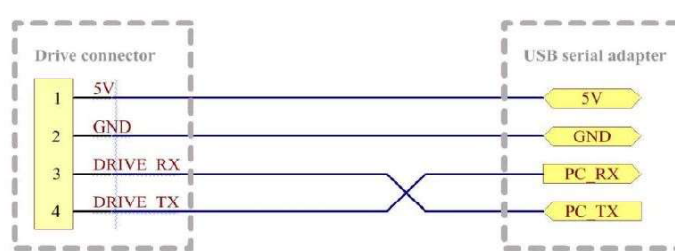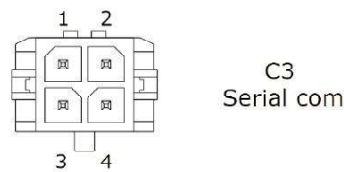
2.4   Inputs and outputs connection

I/O CONNECTOR C2		
1	CAN-TERM	CAN L termination resistance 120 Ohm
2	CANL	CAN-Low
3	CAN_GND	CAN-GND / board GND
4	DGT-IN2	Digital input 2, 24V - PROGRAMMABLE
5	DGT_OUT_2	Digital output 2
6	DGT_OUT_VCC	Digital output Vcc
7	DGT_OUT_1	Digital output 1
8	AGND GROUND	Analog ground of AGND-IN1 and 2. Connect to GND of ext. controller
9	CAN-TERM	CAN H termination resistance 120 Ohm
10	CANH	CAN-High
11	ANALOG-IN1	Analog input 1, 0-10V - PROGRAMMABLE
12	ANALOG-IN2	Analog input 2, 0-10V - PROGRAMMABLE
13	DGT-IN1	Digital input 1, 24V - PROGRAMMABLE
14	5V	Otput supply 5V@200mA
15	DGT-OUT-GND	Digital output GND
16	CONTROL SUPPLY	Control board power supply, supply with a voltage from 10V to 80V

Connector C2 (I/O - CanOpen)

3.0   Serial Communication

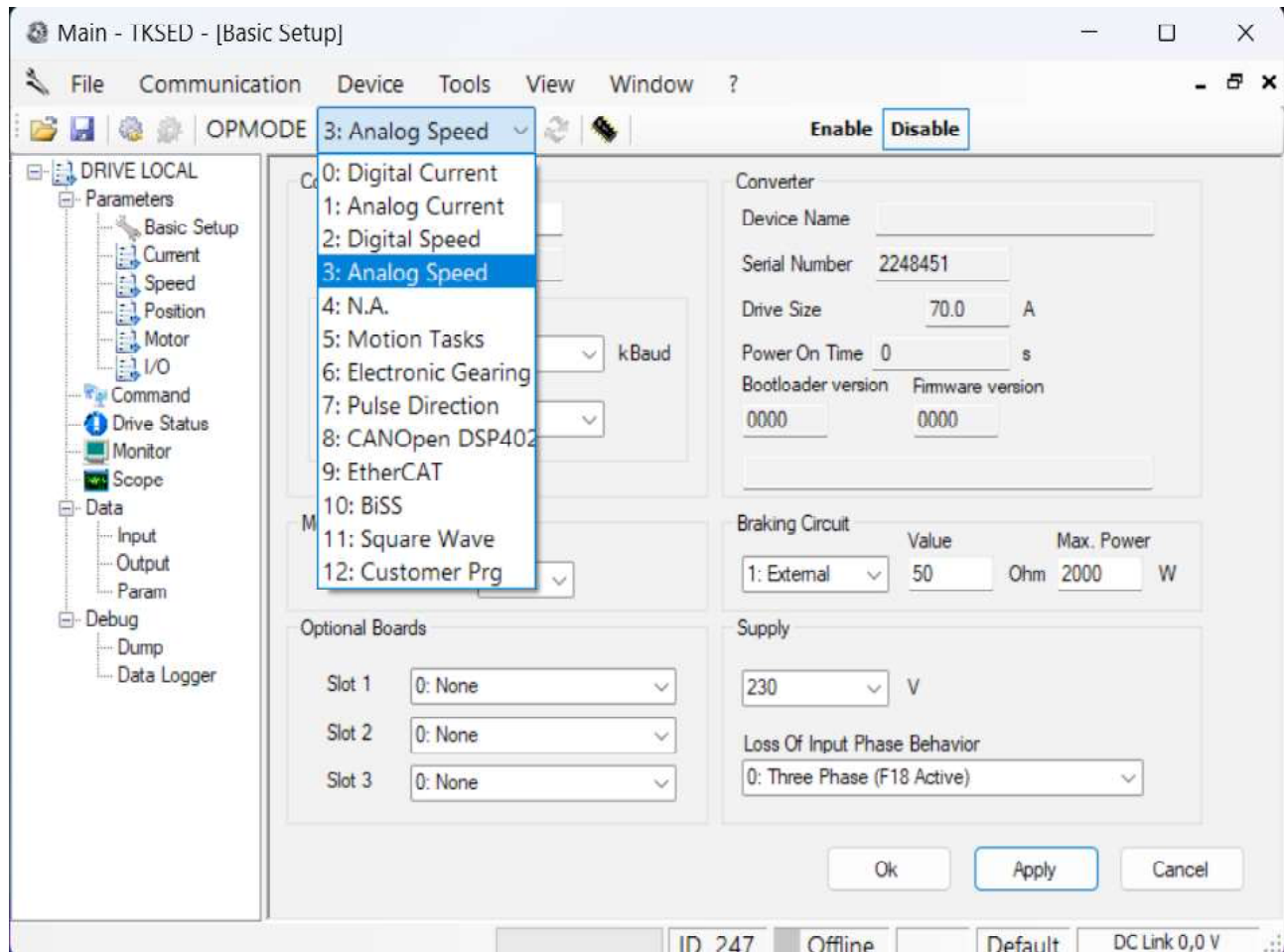| SERIAL COM COMMUNICATION		
PIN	NAME	DESCRIPTION
1	5V	Output supply 5V@200mA
2	GND	Ground 0V
3	RX	RX Signal communication
4	TX	TX Signal communication

C3
Serial com

The Mini Traction Power product comes with a TKSED software interface to be installed on your notebook. The interface is free.

The connection is possible via a USB/RS interface complete with cable and connector that can be inserted into C3 (see figure).

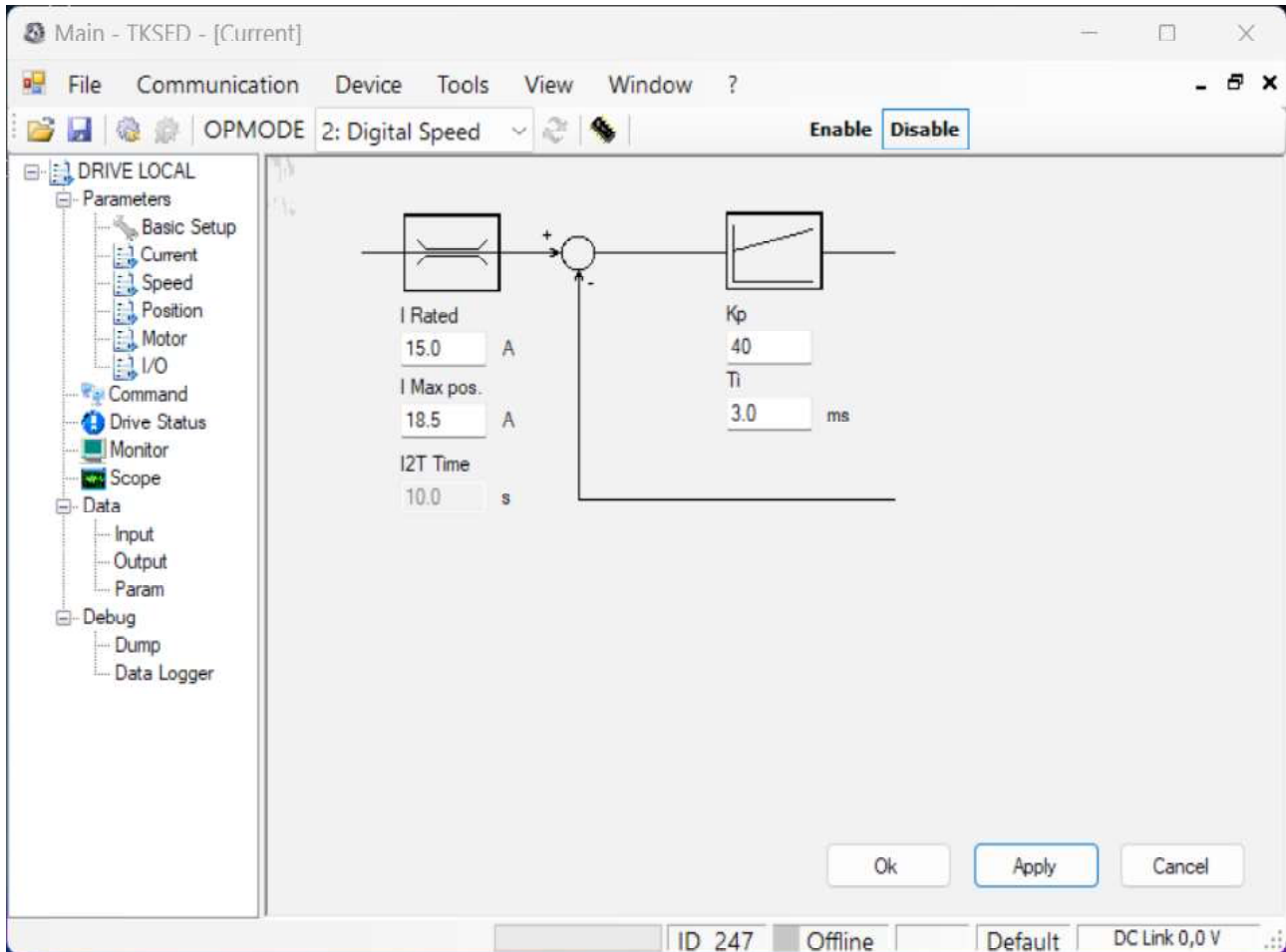For the supply of this USB/RS interface, contact Microphase.

4.0 Software interface

To program the converter, the interface software is provided (free of charge). In the OPMODE window, you can set the operating mode of the servodrive.

To change or enter values, click on the Ok and Apply boxes so the value is saved. To retain it and store it in the internal flash memory, click on the top window with the Chip symbol.
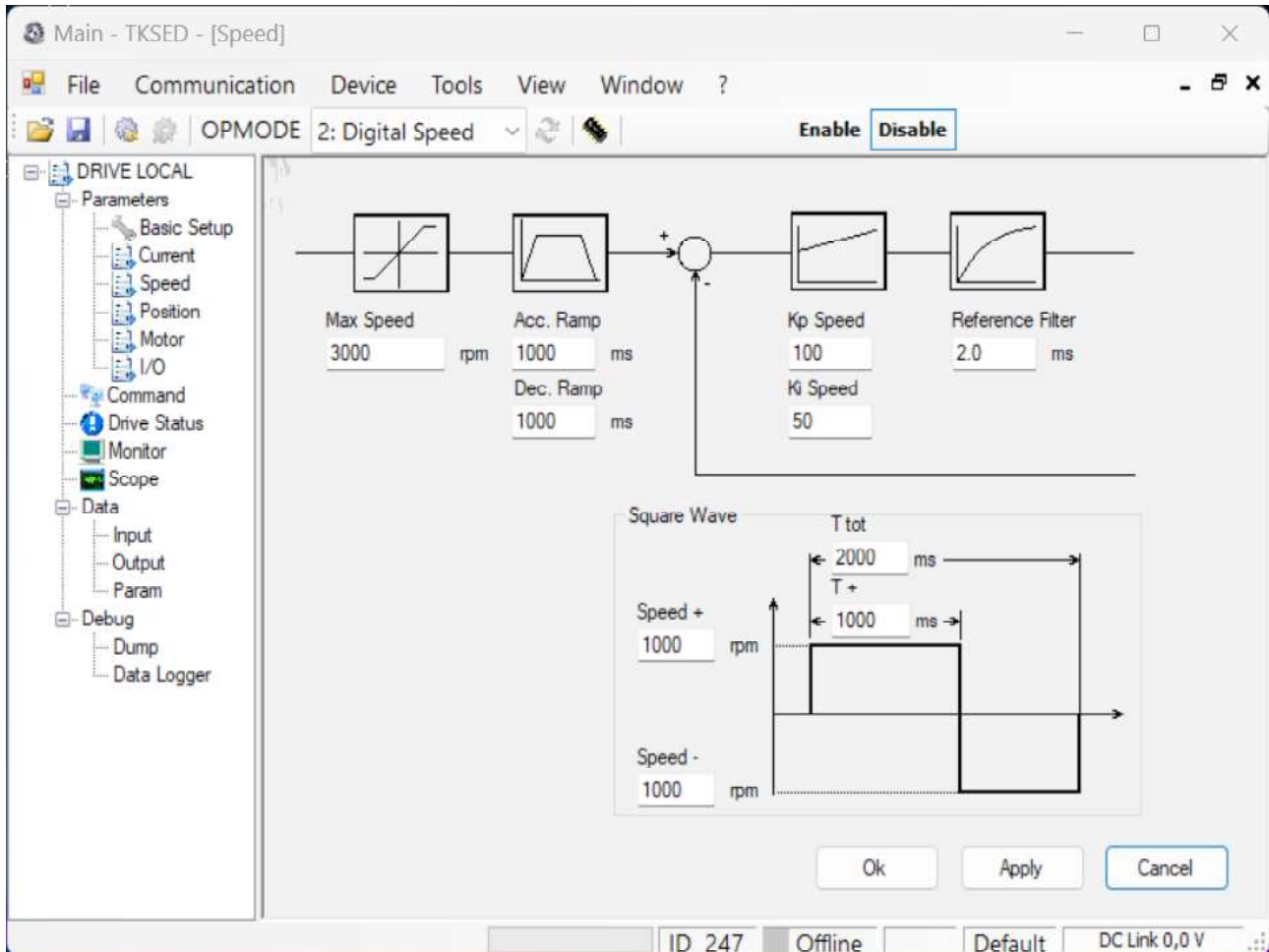
4.1   *Software interface*

In the Current window, you can set the nominal and peak current values, as well as the gains for the PROPORTIONAL and INTEGRAL current loop.

To change or enter values, click on the Ok and Apply boxes so the value is saved. To retain it and store it in the internal flash memory, click on the top window with the Chip symbol.
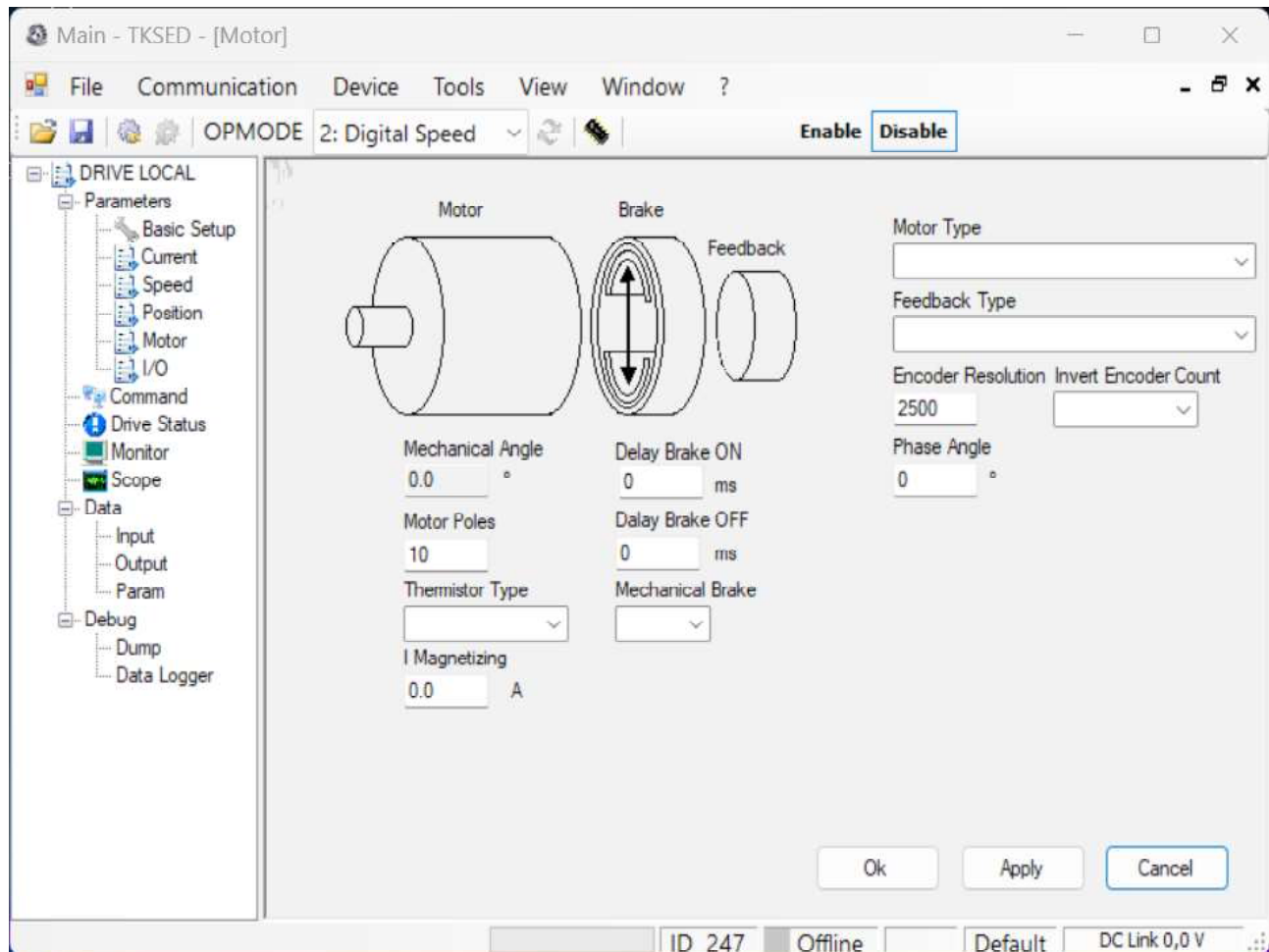
4.2   *Software interface*

In the Speed window, you can set the motor's maximum speed in RPM and the acceleration/deceleration time. Additionally, you can configure the proportional and integral gains of the speed loop. A filter, in milliseconds, can also be applied to reduce potential noise on the reference signal input.

To change or enter values, click on the Ok and Apply boxes so the value is saved. To retain it and store it in the internal flash memory, click on the top window with the Chip symbol.
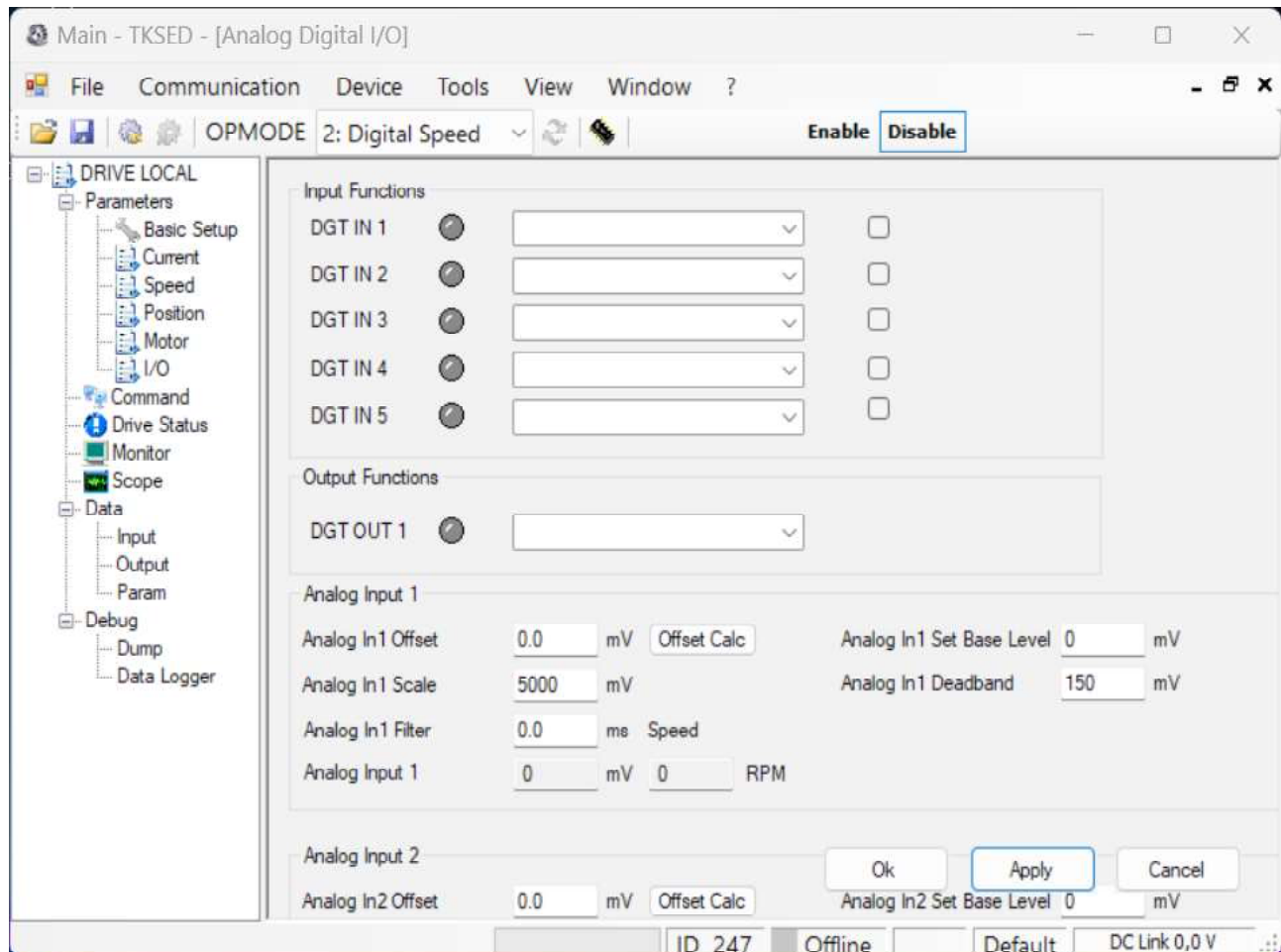
4.3   Software interface

In the Motor window, the following settings are configured:
The motor's number of poles, the type of feedback, the number of pulses of the incremental encoder, etc.
To change or enter values, click on the Ok and Apply boxes so the value is saved. To retain it and store it in the internal flash memory, click on the top window with the Chip symbol.
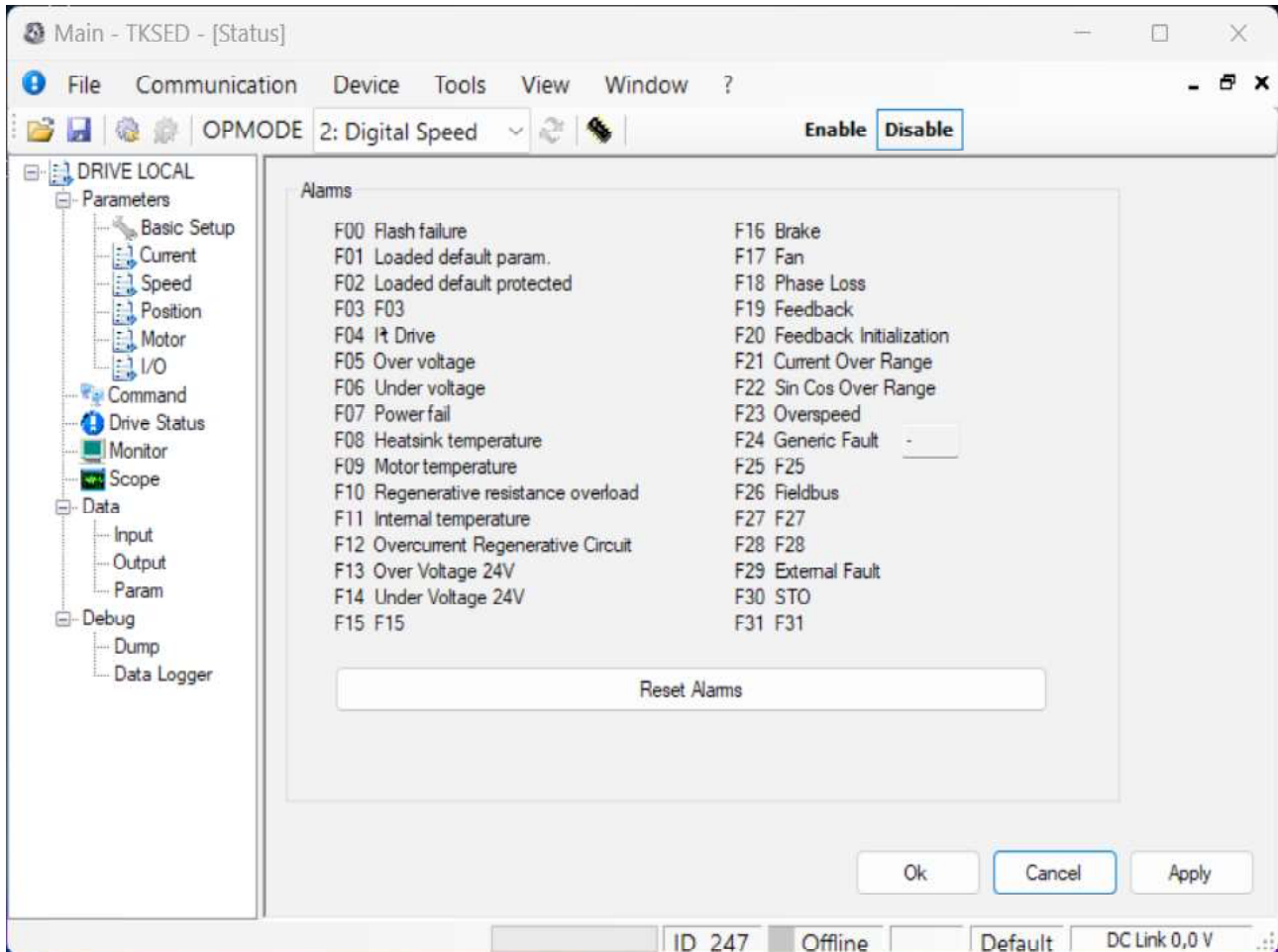
4.4   Software interface

In the I/O window, you can set the operating functions that can be assigned to the digital inputs.

On the Mini Traction Drive converter, there are 2 available inputs. Additionally, in the Analog In1 and Analog In2 fields, you can set the reference speed signal value in mV, which will correspond to the motor's maximum speed.

To change or enter values, click on the Ok and Apply boxes so the value is saved. To retain it and store it in the internal flash memory, click on the top window with the Chip symbol.
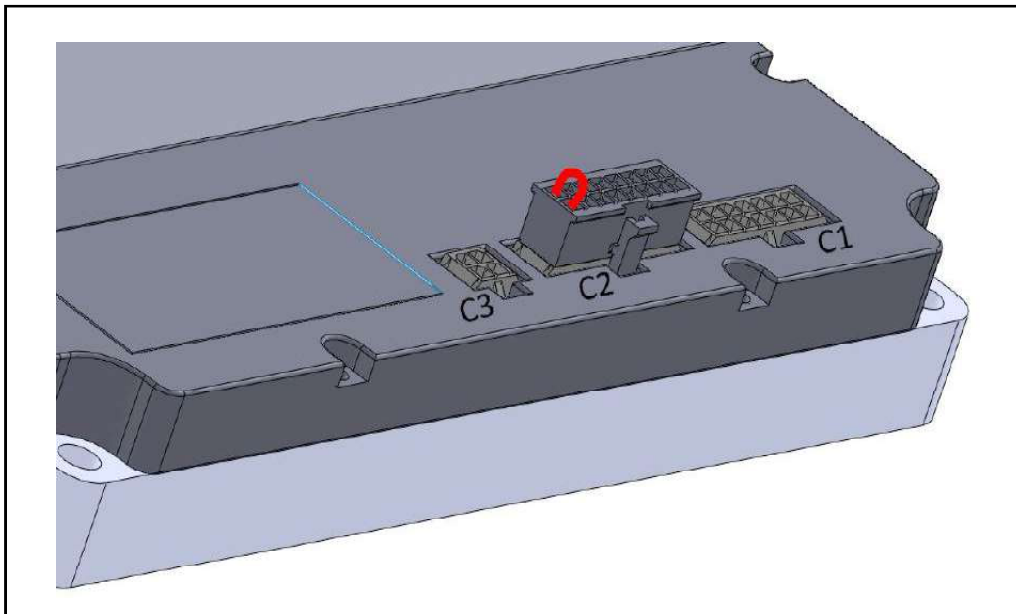
4.5   Software interface

In the Drive Status window, any converter errors are displayed. For further information, please contact Microphase.

5.0   *CanOpen*

When using CANOpen DSP402 the following parameters are already set in the drive:
- Baud Rate = 500 kBaud
- DeviceID = 1

When the bus termination is needed manage the female connector as follow:

By shorting pin 1 with pin 9 a 120ohm resistor is set between CAN_High and CAN_Low wires.

In order to help eliminate electromagnetic interference, the wires need to be shielded and twisted together to create a canceling effect.