MICROPHASE
Technology & Performance

Mini Dc

SERVO AMPLIFIER FOR BRUSH DC MOTORS

Eurocard Servodrive for Brush motors

Service Manual

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1.1 Safety and note

Caution

Users must keep well clear in mind that this motion control equipment is capable of producing high forces and rapid movement so they must be used with attention especially during the application program's development.

This motion control equipments are sold as end-users products to be installed only by practical staff in accordance with all local safety laws and regulations. The device have to be enclosed such that any part is not be accessible while the system is powered on.

We strongly reccomend to follow these recommendations in order to avoid wrong uses of the equipment that may be impaired all the protections provided by the device.

Please read these notes carefully before powering up the drive

It is very important meet all applicable safety requirements during installation and operating of any motion control equipment. Any installer has to assume the responsibility to ensure that he recognizes and complies all the relevant safety standards. Any installation, not meeting the safety requirements, may damage the equipment or injury the user.

This motion control equipment shoul be handled, installed, setted-up and maintenanced only by competent personnel expert and trained in the installation of motion control electronic equipment. Such technicians should be aware of potential electrical and mechanical hazards. Shall never beliable or have any responsability if the products have been improperly stored, installed, used or maintened, or if the costumer has permitted any unauthorized modifications, adjustments, and/or repairs to the products.

Simbols security standard

Warning of dangerous current present
In case of doubt or in any case you don't know as to behave yourself, before access to the drive, power off the device and wait until all the leds are turned off.
May you have attention when you touch the drive because it may be hot.

Danger Sign
All the circuits in the Drive are potential sources of severe electrical shock, so follow these rules to avoiding possible personal injury.
- Power off the drive and wait until all the leds are turned off before touching, removing, connecting or any other critical action.
- Never disconnect any connectors before powering down the drive

1.2 Operation mode and feedback

Description

This is a drive capable to drive **DC brush** motors, up to 9Nm. It's a High Performance full four quadrant drive servo amplifier. The mosfet output power stage is controlled by a 20 Khz PWM (Pulse Width Modulation) signal that allows it to drive servo motors where high dynamic performance and precise speed is required.

Operation mode

DESCRIPTION		
SPEED CONTROL INPUT	It is speed piloting using an analogue reference (differential or common mode)	STANDARD
TORQUE CONTROL INPUT	It is torque piloting using an analogue reference. This function allows you to control the current from the drive.	STANDARD

General characteristic

DESCRIPTION		
START INPUT	Start input, enable the drive with range from ≥9Vdc to +30Vdc (min/max)	STANDARD
FAULT OUTPUT	Fault drive, open collector output 100mA max. (Normally closed, opens when in protection mode)	STANDARD
2 ANALOG OUTPUT	1 motor velocity monitor “V.TACHO”, with range +/-8 Vdc output 1 current monitor "I.MOTOR", with range +/-8 Vdc output	STANDARD
LED INDICATOR	Four LEDs are located just in front of the potentiometers and show the current state of the drive	STANDARD

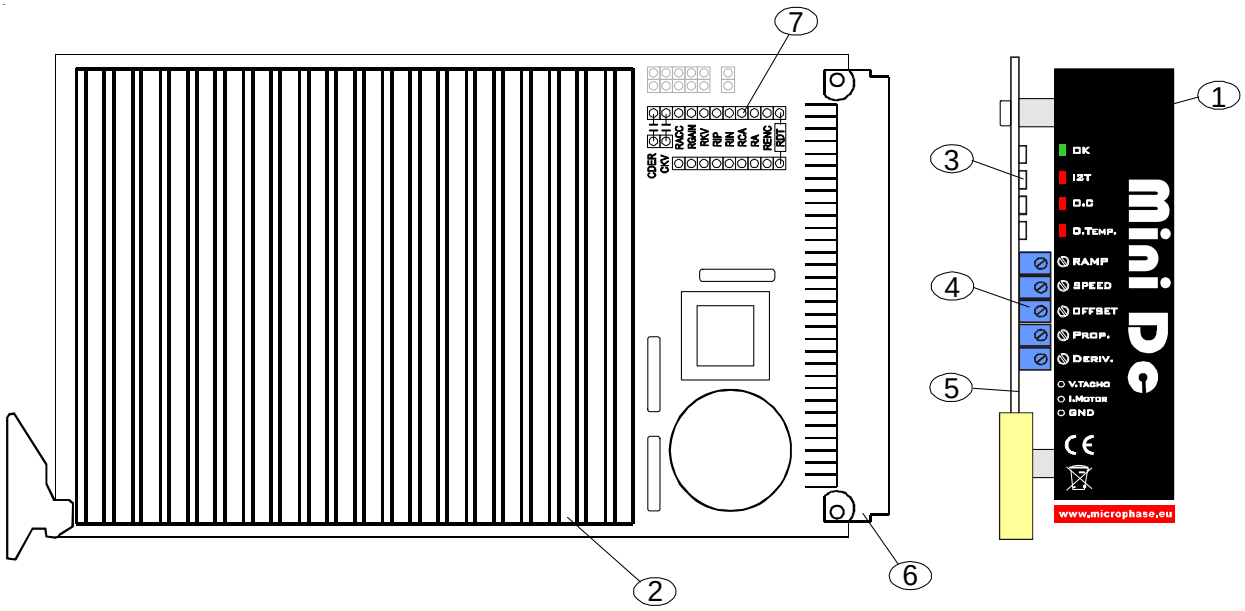
Velocity feedback

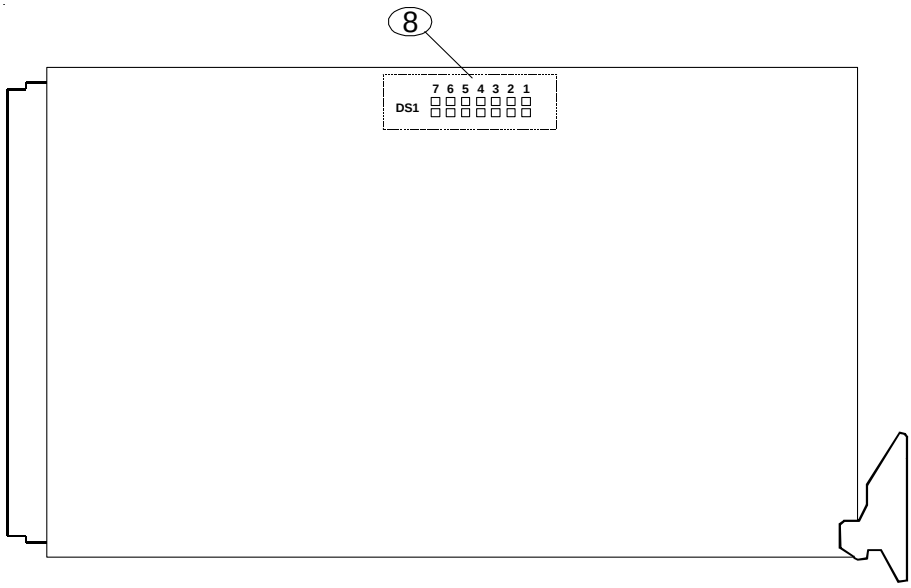
Closing the velocity feedback loop to motor may be done in several different ways to accommodate most applications. This types of velocity feedback are available with DC brush motors.

- DC motor with tachogenerator
- DC motor with internal PWM (Armature)
- DC motor with encoder

1.3 View product

(1) Product ID Label
(2) Aluminum heatsink
(3) Leds
(4) Calibration Potentiometers
(5) Test point (V.tacho, I.Motor, GND)
(6) DIN 64 connector (32a+32c) pitch 2,54
(7) Adjustement zone
(8) Adjustement settings





1.4 Model and size

Model available

POWER SUPPLY		
Model 65	19 - 84 Vdc*	60Vdc **
Model 145	39 - 184 Vdc*	140Vdc **
Model 205	54 - 276 Vdc*	200Vdc **
* Power supply min/max **Typical		

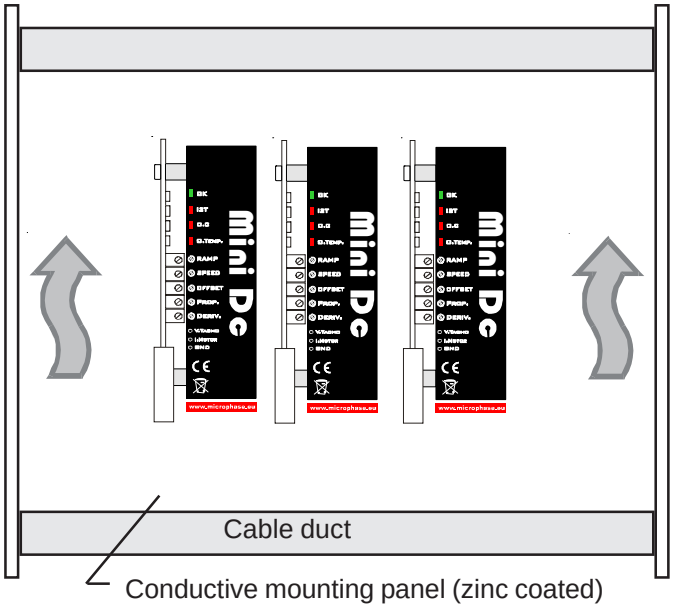
Size available

CURRENT		
Size	Rated current (A)	Peak current (A)*
3/6	3	6
4/8	4	8
7/14	7	14
10/20	10	20
14/28	14	28
20/40	20	40
*Peak current during 2 sec		

Specifications

TECNICAL DATA CHARACTERISTICS	
Supply voltage output	0,9 Vdc Input
PWM frequency	20Khz
Operating temperature	0/+45℃
Storage temperature	-10/+70℃
Drift analog input	0,5uV/℃
Analog inputs (+/-REF)	+/-10Vdc max, impedance 20Kohm cad.
Current monitor output (I.MOTOR)	+/- 8Vdc = Peak current
Velocity monitor output (V.TACHO)	+/- 8Vdc = max velocity
Power supply output (+/-9.8V)	+/-9.8Vdc max. 4mA
Encoder max. frequency	300Khz with level ≥+2,8/24Vdc min/max
Fault drive output	NPN 100mA max.
Start input (Enable)	≥+9V/+30Vdc (min/max)
Band width (current)	2KHz
Band width (velocity)	150Hz
Minimum Inductance motor	200uH
Weight	0,42kg
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 heatsink, the PCB and the electronic component meet 94V-0

1.5 Ambient conditions



Positioning in the electrical box

Follow the instructions in the positioning of the servodrive in the electrical box.
- The drive is natural convection air flow cooled.
- To ensure the drive cooling and make the installation easier for the operator it must be installed vertically leaving a free space of at least 25 mm on each side of the device. The converter must be mounted vertically on the electrical box.
- The electrical box must have suitably filtered air vents.
- Leave the necessary space both above and below the converters.
- Keep the drive from excessive mechanical vibration

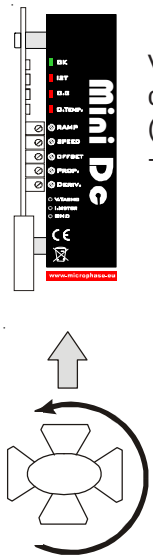
1.6 Ventilation

This servodrive are intended only for use in close locations. Ambient characteristics: operating temperature from 0 to +45°C. Humidity limit s between 5% to 95% non condensing (Pollution degree 2 or better). Supplementary ventilation may be requested in accordance to size. See the table below.

SIZE						
MODEL	3/6	4/8	7/14	10/20	14/28	20/40
65	N	N	N	N	N	N2
145	N	N	N	N	N2	V
205	N	N	N	N2	V	V

N = Standard radiator (operating ambient temperature from 0 to 45°C)
N2 = Standard radiator (operating ambient temperature from 0 to 35°C)
V = Standard radiator + supplementary ventilation (operating ambient temperature from 0 to 45°C)

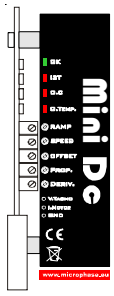
Supplementary ventilation



V = Standard radiator+fan cooling below the converter (operating temperature 0 to +45°C)

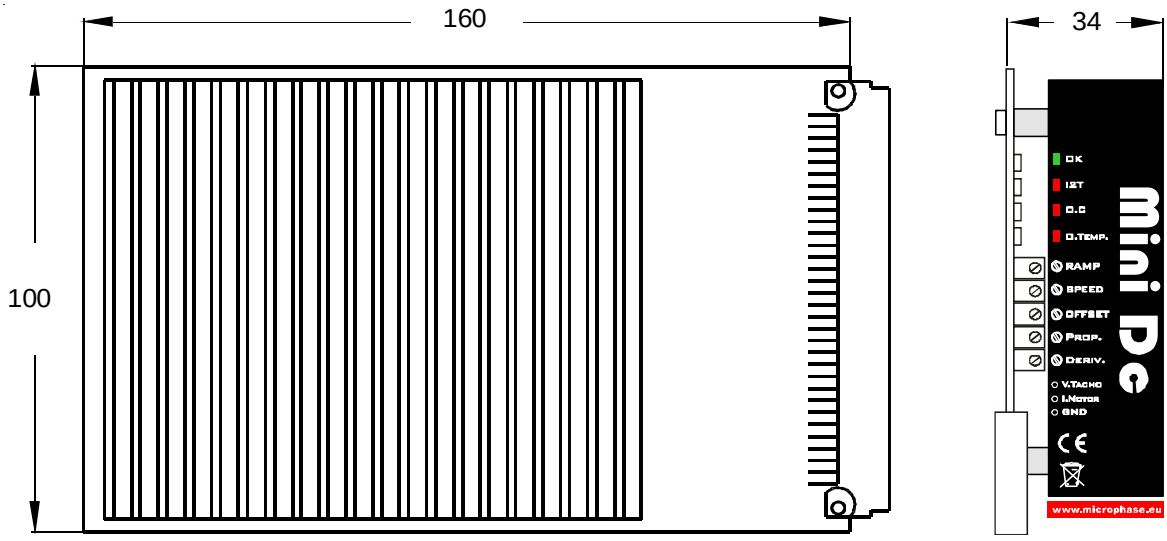
Mounting position

No



Yes

1.7 Mechanical dimensions



Dimensions in mm

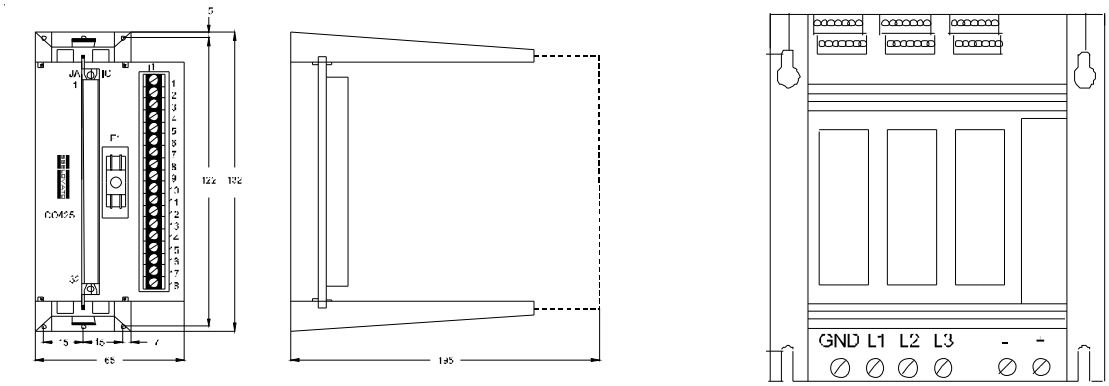
2.1 Input and output signals

The following description refers to the 64 pin DIN connector. ***Wire connections must be made in the terminal boards of the Panel mount and Rack supports.***

DIN 32a+32c CONNECTOR	
1ac	Signal Common Ground. Corrisponds to power supply's negative GND input
2ac	**(OUT)** Fault drive, open collector output max. 100mA Normally closed, opens when the drive in protection mode
3ac	**(IN/OUT)** TPRC input. Torque request and current limit
4ac	**(OUT)** Power supply -9.8Vdc max 4mA
5ac	**(OUT)** Power supply +9.8Vdc max 4mA
6ac	**(IN)** Reference Positive differential input (Velocity command)
7ac	**(IN)** Positive drive enable with range ≥+9Vdc min. to +30Vdc max
8ac, 10ac, 12ac	**(IN)** Programmable inputs.
9ac	**(IN)** Tachogenerator input
11ac	**(OUT)** +/-4Vdc=Rated current, +/-8Vdc=Peak current output in Volts. This output may be used to monitor the torque the motor is producing.
14ac, 15ac, 16ac, 17ac	**(IN)** Positive power supply +HV voltage
19ac, 20ac, 21ac, 22ac	**(IN)** Negative power supply GND POWER
24ac, 25ac, 26ac, 27ac	**(OUT)** Motor output +M
29ac, 30ac, 31ac, 32ac	**(OUT)** Motor output -M

Rack and Panel mounting kit

Are available rack-mount installation kit and panel-mounting installation kit.



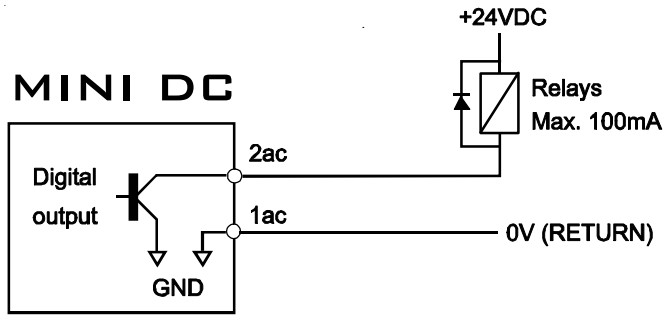
Input and output signals

2.2 Signal common ground GND (1ac)

Signal Common Ground.
Corrisponds to power supply's negative GND power input (19ac, 20ac, 21ac, 22ac)

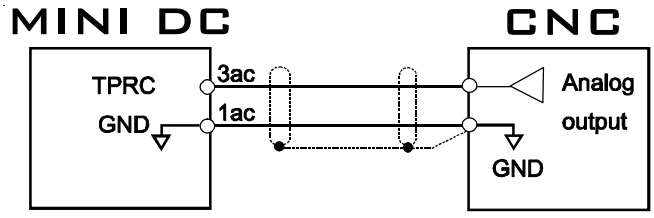
2.3 FAULT output (2ac)

Fault drive, open collector output max. 100mA
Normally closed, opens when the drive in protection mode



2.4 Current request TPRC (3ac)

With a voltage (example from a CNC output) you can command the drive in torque mode.



Applying a signal of +/-10V at TPRC, the Drive to supply positive or negative peak current.
The formula to determine the value of Voltage to apply in TPRC in order to obtain requested current is the following:

V(TPRC) = 10 * Request current / PKcurrent Drive

Example: (Drive size 10/20A, request current 8A)

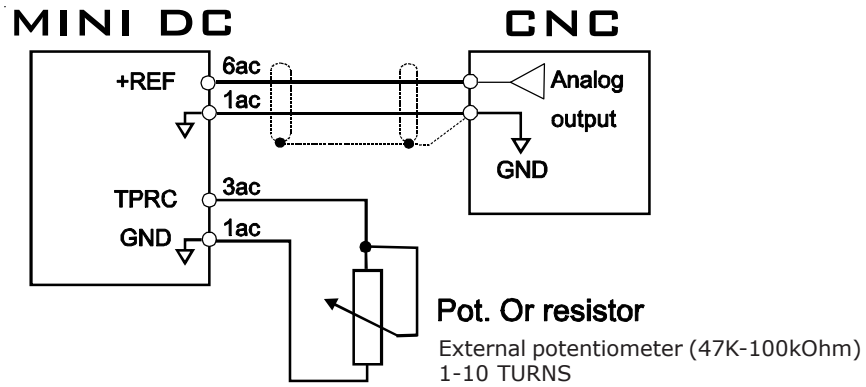
V(TPRC) = 10 * 8 / 20 = 4V

NOTE:
In current reference the loop of internal velocity automatically excludes itself .

Input and output signals

2.5 Current limitation TPRC (3ac)

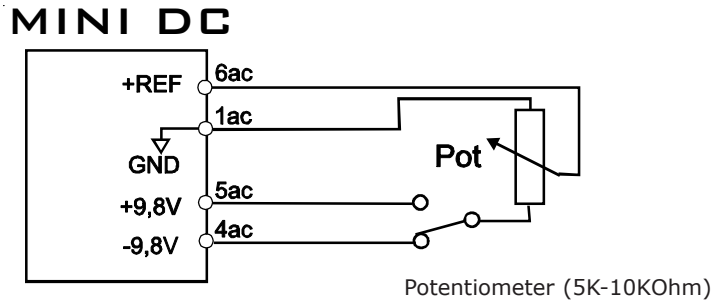
With an external potentiometer connected from GND and TPRC input, you have a limitation of output current (from zero to max. size) drive's.



The speed loop remains active and uses the input reference signal +/-VEL.
Connect between terminal and GND terminal TPRC a resistor 1/4W or 1/8W. (The figure is used a potentiometer). With external resistance tends to zero ohms, the output current tends to zero. Increasing the ohmic value of resistance, the value of current supplied increases. With 47K of the current is limited to 50% on the Maximum size. The loop motor speed remains active.

2.6 Ausiliary power supply +/-9,8V (4ac and 5ac)

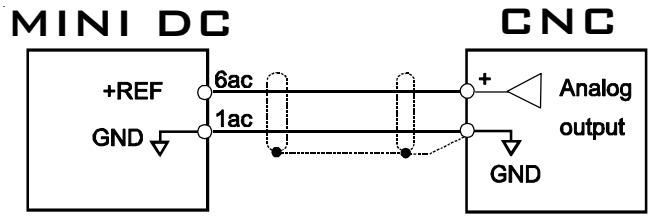
In the terminals 5ac (+9.8V) and 6ac (-9.8V) are available auxiliary supplies to power the potentiometer reference speed. In the attached drawing below is also added a switch that allows the reversal of the rotation motor speed .
The current capacity of the output is max + /-4mA
Output +9.8V can also be used to enable the converter



Input and output signals

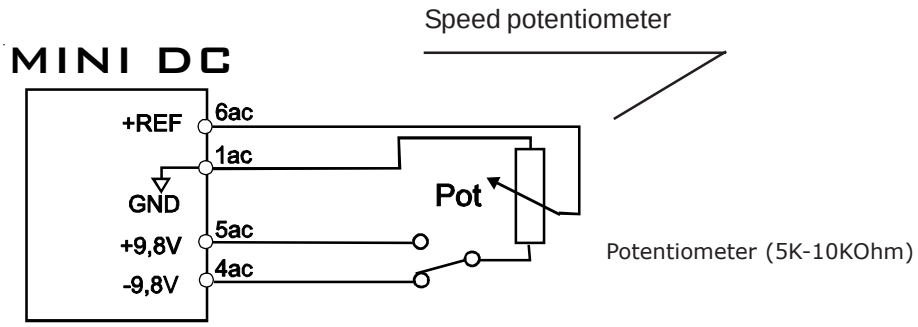
2.7 Analog reference input +REF (6ac)

The following diagram shows an application using speed reference connections from C.N.C in the Common Mode. This analog in common mode has a 20Kohm of impedance input.



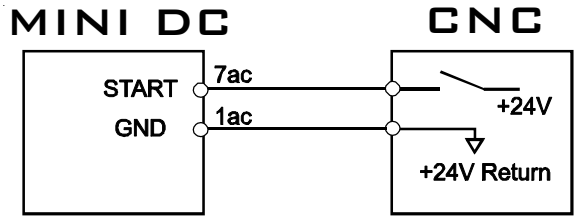
Analog reference input +REF (6ac) from external potentiometer

The following figure shows an application with speed reference connections using an internal +/-9.8V power supply.
The speed potentiometer must have an included value between >5 and <10Kohm.



2.8 START input (7ac)

The standard drive is furnished in this configuration.
Start enable input has logic range: ≥+9V to +30Vdc (min/max)



Unconnected Enable input = Drive Not Enabled
Enable Input +24Vdc = Drive Enabled
Is possible enable the drive connected the START input with +9.8V output "terminal 5ac"

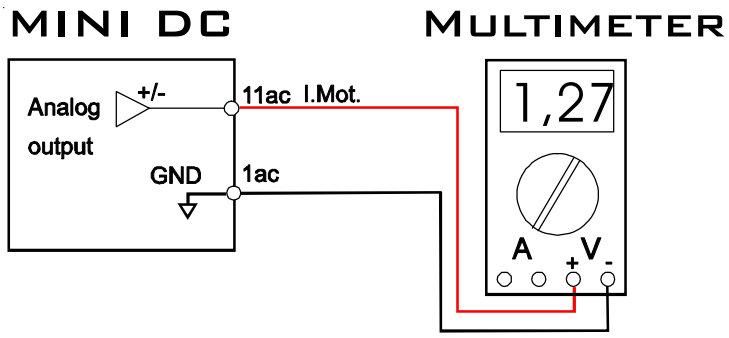
Input and output signals

2.9 Tachogenerator input (9ac)

When the motor have a tachogenerator you can use the terminal 9ac as input for this feedback. Connect this terminal to the negative of tachometer.

2.10 Current monitor output (11ac)

On this terminal is available analog output "current monitor of motor" with range 0V + /-8V. The value of 8V is the maximum current supplied by the drive. For example, if we have a size 7/14A, 8V corresponds at 14A circulating on the motor.
The signal can be positive or negative depending on the direction of rotation of the motor.



2.11 Encoder inputs

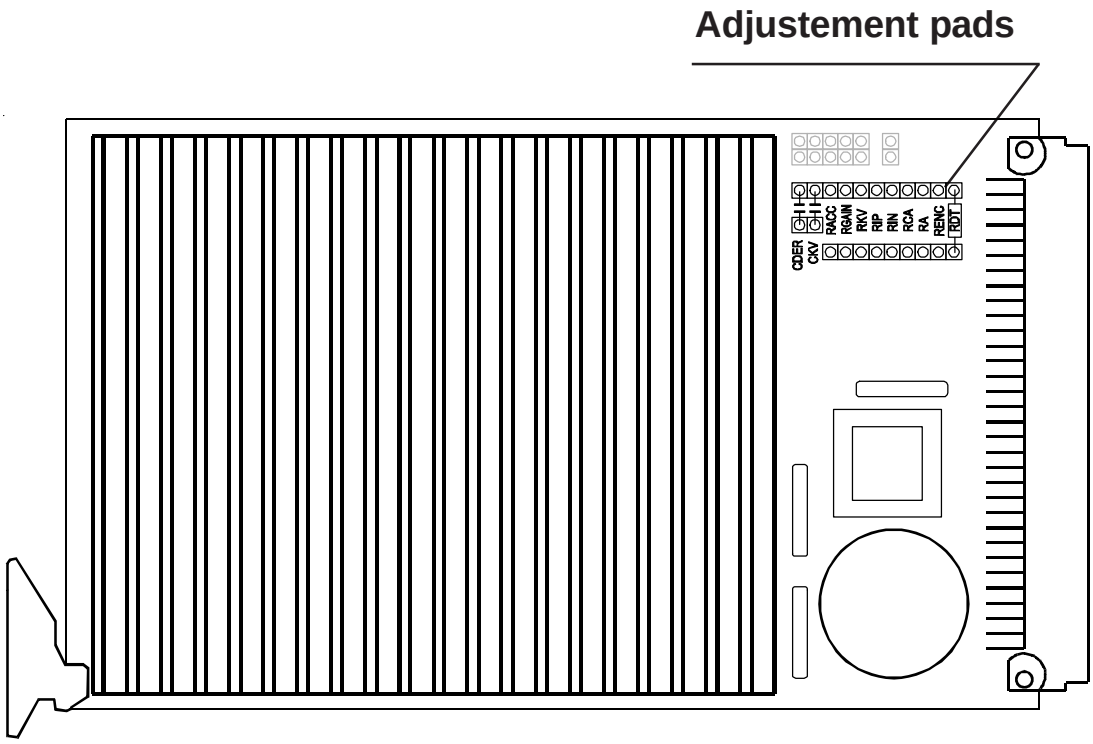
In the terminals CHA and CHB (on the rack or panel-mounting) can connect the inputs from an incremental encoder for the current feedback in response to encoder. signals can come from encoder powered from +5 V to +24 V).

Minimum high logic level > +2.8 V/24Vmax,
Minimum low logic level <1.5V

Encoder can be connected either push-pull (wires A, B and GND) or line-driver encoder type (wires + A + B and GND). Remember to connect the zero encoder with the GND signal converter.

3.1 Internal adjustements

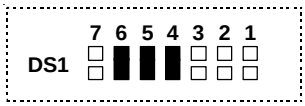
If changes need to made to the internal drive setting powering, please wait at least 20 seconds after the power has been removed and the OK LED is off.
All of the personalizations are located inside of the DRIVE. (See figure above)
To gain access to the adjustment pads (TOP DRIVE) and the Dip DS1 (BOTTON DRIVE)



DS1 SWITCH standard position are setting by factory for:
- Tachogenerator feedback
- Ramp time disabled
- Standard Dynamic constant

Dip 7:	Open (OFF)
Dip 6:	Closed (ON)
Dip 5:	Closed (ON)
Dip 4:	Closed (ON)
Dip 3:	Open (OFF)
Dip 2:	Open (OFF)
Dip 1:	Open (OFF)

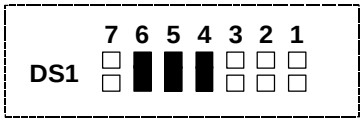
Adjustement Dip (DS1) standard configuration



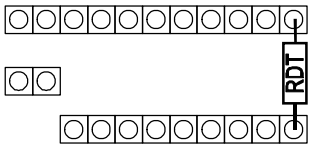
3.2 Setting with tachogenerator feedback

In this configuration, the drive must set with the following Dip Switch and below internal setting:

DS1 SWITCH



ADJUSTEMENT PADS



DS1 Switch set for:
- Tachogenerator feedback
- Ramp time disabled
- Standard Dynamic constant

Note: On the adjustement zone are not considered here the other components used to determine other calibrations "for example. Calibration current rating etc.".

RDT resistor calculations

To calculate RDT resistor, please use the following formula:

$$\text{RDT (Kohm)} = \frac{\text{Kdt} * \text{N} * 9{,}7}{1000 * \text{Vref}} - 7{,}9$$

Example: Brush DC motor with the tachogenerator costant Kdt=10V/KRPM, max. speed 2500RPM at 10V of speed reference. The result is below:

$$\text{RDT (Kohm)} = \frac{10 * 2500 * 9{,}8}{1000 * 10} - 7{,}9 = 16.6 \text{ Kohm}$$

Insert the commercial value resistance 18Kohm. Prefer resistance with 1% tolerance.

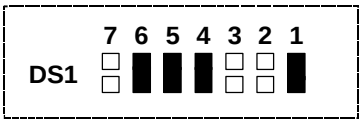
Note:
RDT is the value of resistor expressed in Kohm with a power rating of 1/8 or 1/4w.
Kdt is the tachogenerator costant V/KRPM
N is the max speed express in RPM.
Vref is the max voltage +/-REF reference express in Volts.

Once the resistor **RDT** is inserted, proceed with final speed adjustment.
Operate using trimmer SPEED on the front of the drive. With Clockwise Rotation the speed increases. With Counter Clockwise Rotation the speed decreases. The Range of regulation is about +/- 20%.

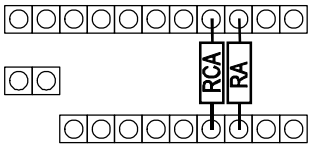
3.3 Setting with armature feedback

In this configuration (Motor with only +M and -M armature), the drive must set with the following DS1 Switch and below internal setting:

DS1 SWITCH



ADJUSTEMENT PADS



DS1 Switch set for:
- Armature feedback
- Ramp time disabled
- Standard Dynamic constant

Note: On the adjustement zone are not considered here the other components used to determine other calibrations "for example. Calibration current rating etc.".

RA resistor calculations

Insert on base "RA" to adapt the system to use the motor voltage.

Where: Vdc = Vrms * 1,41

Table Vdc voltage — Value of RA in Kohm

RA	82	68	56	47	39	33	27	20	15	12	8,2	5,6	3,9	1
65	57	53	49	45	42	38	34	28,5	23	20,5	16	12	10	5
145	121	113	105	97	88	81	72	60	50	43	33	26	20	10
205	206	193	178	165	151	138	123	103	86	74	57	44	35	18

Model — Voltage output Vdc

EXAMPLE: **Brush DC motor** with Ke= 26V/Krpm (Vdc)
Drive model 145
Nominal speed N° =3000rpm
Risult: Vdc= 26*3000/1000= 78V

For the Example, risult Vdc=81V. The table shows a resistor with a value of 33Kohm.

Once the resistor **RA** is inserted, proceed with final speed adjustment.
Operate using trimmer SPEED on the front of the drive. With Clockwise Rotation the speed increases. With Counter Clockwise Rotation the speed decreases. The Range of regulation is about +/- 20%.

RCA resistor calculations

Insert an RCA resistor on the header (ajustement zone) to compensate for voltage loss due to the motor resistance reducing the loss of RPM.
The formula is as follows:

$$\text{RCA (Kohm)} = \frac{0{,}49 * 1000 * \text{Vmot}}{\text{Vref} * \text{Ipk} * \text{Ri}}$$

Where:
Vmot= Nominal voltage of the motor
Ri=Max. cold motor resistance.
Ipk =Peak drive current.
Vref= max. applied reference voltage in REF

Example: Drive 7/14A, Ri=0,3ohm, Vmot=36V, Reference=10V

Calculate:

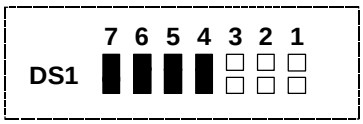
$$\text{RCA (Kohm)} = \frac{0{,}49 * 1000 * 36}{10 * 14 * 0{,}3} = 420\text{K}$$

Insert a 470Kohm resistance. If after insertion of the resistor the motor is unstable, increase the Resistance value of RCA.

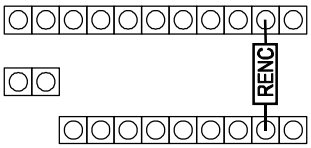
3.4 Setting with encoder feedback

In this configuration, the drive must set with the following DS1 Switch and below internal setting:

DS1 SWITCH



ADJUSTEMENT PADS



DS1 Switch set for:
- Encoder feedback
- Ramp time disabled
- Standard Dynamic constant

Note: On the adjustement zone are not considered here the other components used to determine other calibrations "for example. Calibration current rating etc.".

RENC resistor calculations

For calcolation this resistance apply the following formula:

RENC = 681*1000 / Fenc

The resistor RENC determine what is the max. speed of the motor at 10V of reference.

Where: **Fenc = PPR * rpm / 60**

Example:
N° encoder (PPR) = 500
Motor max. speed 4000 rpm

Fenc = 500 * 4000 / 60= 33.333
RENC = 681*1000 / 33.333 = 20,4 kohm

The result of RENC resistance is 20 or 22 Kohm. Prefer resistance with 1% tolerance.

Once the resistor RENC is inserted, proceed with final speed adjustment.
Operate using trimmer SPEED on the front of the drive. With Clockwise Rotation the *speed increases*. With Counter Clockwise Rotation the *speed decreases*. The Range of regulation is about +/- 20%.

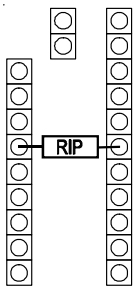
Note: The A and B signals may come from encoders powered by + 5V to + 24V).
The accepted logical levels are:
Minimum high logic level > + 2.8V / 24Vmax,
Minimum logical low level <1.5V
Can be connected push-pull encoders (wires A, B and GND) or line-driver encoders (wires + A, + B and GND). Remember to combine the zero supply of the encoder with the GND (Ground of the converter).

Connections: Wire A of the encoder is connected to terminal CHA, wire B to terminal CHB to the rack-mount or panel-mounting installation kit. The encoder supply zero must be connected to the GND terminal. For details contact Microphase.

3.5 Current adjustement

RIP resistor (Peak current adjustment)

RIP resistance limits the maximum current supplied by the converter. For the calculation see the following table:



Value of RIP in Kohm

Valore RIP	*	470	390	220	150	120	100	82	68	56	47
3/6	6	5,7	5,4	5	4,5	4	3,8	3,5	3,3	3,2	3
4/8	8	7,4	7	6,48	6	5,6	5,3	5	4,8	4,2	4
7/14	14	13	12,2	11,3	10,5	9,9	9,3	8,7	8,4	7,5	7
10/20	20	18,5	17,5	16,2	15	14,1	13,2	12,5	12	10,7	10
14/28	28	26	24,5	22,7	21	19,8	18,6	17,5	16,8	15	14
20/40	40	37	35	32,4	30	28,2	26,4	25	24	21,4	20

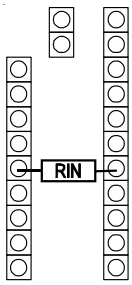
Size drive (A)
Note * = No resistor mounted.

Peak Current request (A)

Example: on a converter 7/14A, inserting a resistance RIP 150Kohm the maximum output current will not be 14A, but 10.5A

RIN resistor (rated current adjustment)

Resistance RIN limits the value of the rated current supplied by the drive. Normally has the same value, of the stall current of DC motor. For the calculation see the following table:



Value of Rin in Kohm

Valore RIN	*	56	22	12	6,8	4,7	3,9	2,7	1,8	1,5	1
3/6	3	2,8	2,7	2,5	2,4	2,2	2	1,9	1,7	1,5	1,3
4/8	4	3,9	3,7	3,5	3,2	3	2,8	2,6	2,2	2,1	1,8
7/14	7	6,8	6,5	6	5,7	5,3	5	4,6	4	3,7	3,1
10/20	10	9,7	9,2	8,7	8,1	7,6	7,1	6,5	5,7	5,3	4,4
14/28	14	13,7	13	12,3	11,4	10,7	10	9,2	8	7,5	6,2
20/40	20	19,4	18,4	17,4	16,2	15,2	14,2	13	11,4	10,6	8,8

Size drive (A)
Note * = No resistor mounted.

Rated Current request (A)

Example: on a converter 7/14A, inserting a resistance RIN 6.8Kohm the rated output current will not be 7A, but 5.7A

3.6 Ramp time adjustement

The product is standard setting with this feature is not enabled DS1 switch (2) and (3) OFF
To enable the ramp acceleration close the DS1 switch 4.

2	3	4	FUNCTION	RANGE	SETTING
OFF	OFF	ON	Ramp disabled	NO	SDT
ON	ON	ON	Ramp enabled	0,1 - 1sec	Variable with ramp trimmer
ON	ON	OFF	Long ramp	Insert RACC	Variable with ramp trimmer

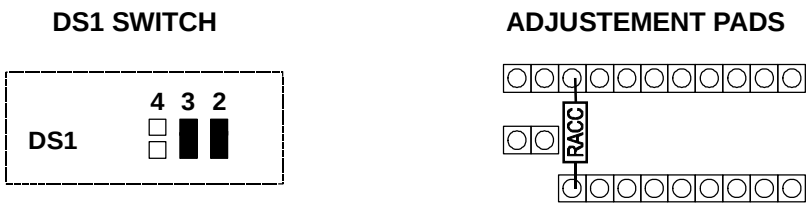
A)

Ramp disabled (STD) **Ramp enabled 0,1 - 1sec**

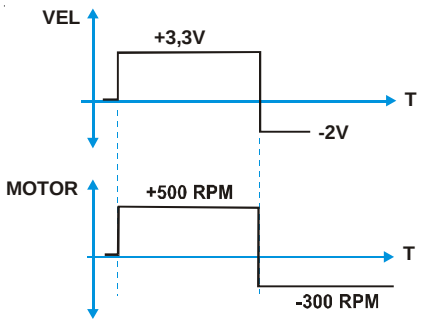
It is possible to modify the pre-set “range of the ramp“ by opening point DS1 (4) and inserting a resistance (RACC) of the value indicated by the table below on the adjustement pads (see B)

RACC resistance value	820 Kohm	1,2 Mohm	3 Mohm
TIME	0,3 - 3 sec	0,5 - 4 sec	1,1 - 12 sec

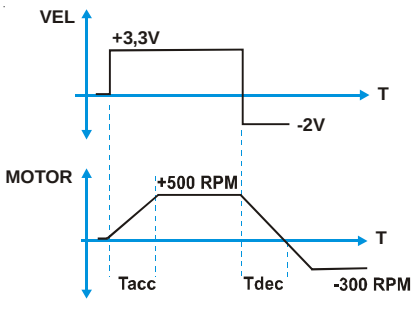
B)



Long Ramp **Insert Racc**



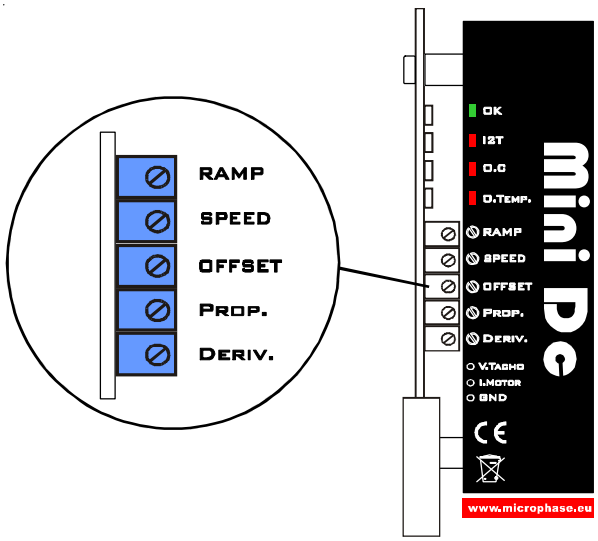
Ramp disabled



Rampa enabled

3.7 Potentiometer adjustements

The converter is equipped with five trimmer with the following meanings:



	FUNCTION
RAMP	**Ramp adjustement.** The DS1 switch 2, 3 and 4 select the acc/dec function (ramp). With this potentiometer we can adjust the slope of the acceleration and deceleration ramps. Turning the potentiometer clockwise (cw) increases the ramp time from 0,1 to 1 Sec (with 10 V input velocity).
SPEED	**Motor fine speed calibration.** With rotating clockwise (CW) or counterclockwise (CCW) is possible increase / decrease the speed of the motor with range + / -20%
OFFSET	**Offset adjustment.** Allows the balance to zero motor speed. Adjust this potentiometer to cancel any motor speed offset when the Velocity input is zero. (Max Velocity compensation +/- 200mV).
PROP.	**Gain potentiometer.** This adjustment improves the dynamic behavior of the motor. With a clockwise (CW) we increase the readiness and response of the motor. With a clockwise turn (CW) we increase the gain of the PI “internal speed loop”.
DERIV.	**Derivative potentiometer.** Acting in a clockwise (CW) can dampen any oscillations of the motor due to a high moment of inertia of the load.

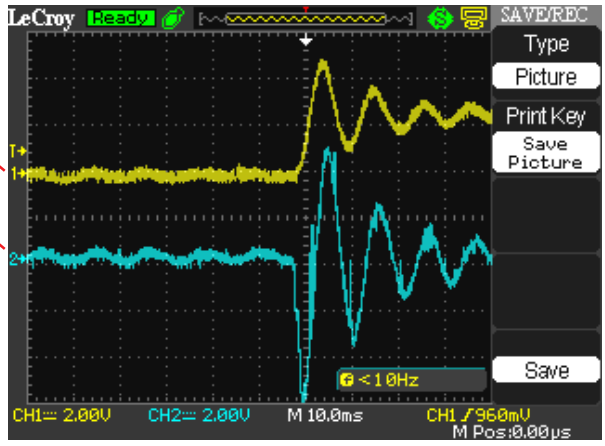
NOTE:
- In Chapter 3.8 explains how to dynamically tune the motor by acting on the 2 trimmer PROP. and DERIV.
- All potentiometers are disabled in Torque mode

3.8 Dynamic adjustement

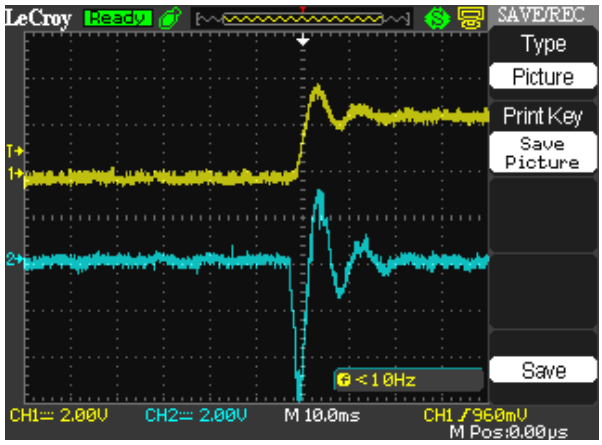
The multi-turn PROP. and DERIV trimmer allow to dynamically tune of the motor and its mechanics linked to it. These trimmers have full excursion from minimum to maximum, with 15 turns of rotation of the same.
The charts shown the track 1 "yellow" is the speed signal available in the point V.TACHO. Track 2 blue highlights instead the current signal taken at terminal 11ac or in the point I.MOTOR
Signals are reported with a step voltage of the reference signal speed of about 2V.
These signals can be displayed by connecting the two probes of an oscilloscope at those points. The zero signal 0S (zero probes) can be connected by a wire to point GND Ground.

Velocity of the motor

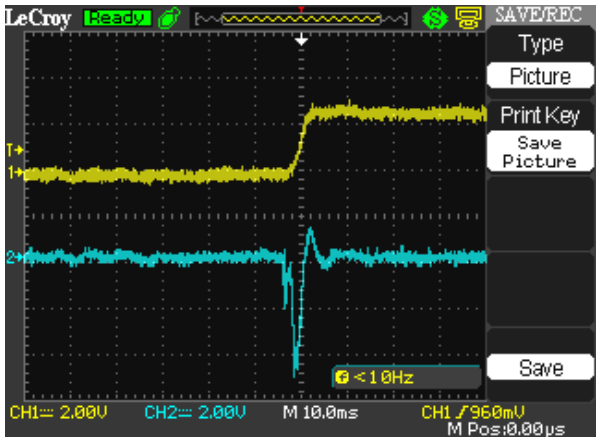
Current of the motor



Behavior of the motor with both PROP. and DERIVATIVES trimmer to a minimum of function (trimmer totally rotated counterclockwise CCW). The speed signal is unstable, idem for the current signal of the motor. See chart at right



Turning clockwise CW the trimmer PROP. (4 / 5 turns) the dynamic behavior improves, not to exceed with this adjustement are otherwise the motor will be vibrating. See chart at right

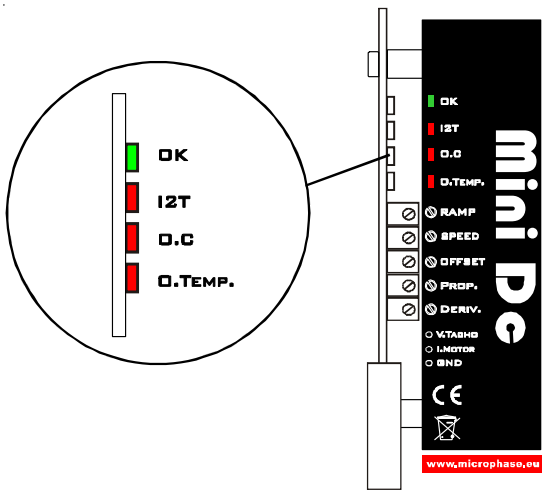


To further improve the behavior of the motor and mechanics related to it and the over all damping of the speed signal oscillation , act trimmer DERIV. turning it clockwise CW (4 / 5 turns). See chart at right

NOTE: The dynamic calibrations are performed using a reference speed (in + /-REF) of about 1 or 2V. You can use the voltage output from the CNC control, paying attention to rule out the correction of space. Or use an external oscillator or a small battery 1.5 V

3.9 Indicator Leds and protections

The protections are all displayed by four LEDs on the front of the drive. It also comes with a series of protections designed to safeguard in case of malfunction, the drive and the motor.



	FUNCTION
OK GREEN	**Normally ON.** Indicating the proper operation of all functions. It turns OFF in case of any anomaly "except protection intervention IxT". The faults that affect this LED are: Over/Under input voltage. Over temperature (PTC). Short Circuit (O.C), outputs shorted to each other or to ground.
I2T RED	**Normally OFF.** This indicator is lit if the converter exceeding the limit calibration of the rated current of the motor. When the current drawn back under the nominal pre-set, the alarm will auto resets and the LED turns off by itself.
O.C RED	**Normally OFF.** Indicates that between the motor terminals and/or ground, has been a short circuit. The operation causes the blocking of the drive and the storage of the alarm. Remove power supply and examine the motor connecting leads for shorts, before re-powering the converter to reset the alarm.
O.TEMP RED	**Normally OFF.** This indicator is lit when the internal temperature of the drive reaches 75℃ . Remove power and wait for the drive to cool before re-applying power. The operation causes the blocking of the drive and the storage of the alarm. NOTE: A fan, heat sink or air conditioner may be needed to remedy the problem.

Possible reason for the allarms of the drive

- When power supply is on the green OK LED doesn't come on. Check the voltage between +HV and -GND with a tester.
- During deceleration of the motor, the LED green blinks. Increase the capacity filter. (example from 10.000uF to 20.000uF)
- LED lights red O.C. Check the connections + M and-M can short circuit between these two wires, between one of these two wires and ground, or short circuit inside the motor.
- LED lights red I2T. Excessive mechanical load
- LED lights red O.TEMP. Ambient temperature too high, or the converter does not have a minimum circulation of air cooling, ventilation or missing where expected from the size of the converter.
- With the green LED the motor will not start when you enable the drive with START
Check for the enable signal START. Also verify the presence of the speed signal between the terminals + /-VEL
- Motor goes out of control when enabled.
- Encoder signals incorrectly connected (ENC A and ENC B signals swapped, or encoder power supply missing, or tachogenerator signals swapped)

White page