



SERVICE MANUAL

AXOR INDUSTRIES®

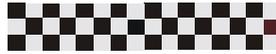
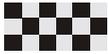
ENGLISH



MICROSPEED PLUS

DC Brushed Servodrive

ver.25/07/2002



The MICROSPEED PLUS series of amplifiers are marked CE because they conform to European Directives for Electromagnetic Compatibility and Low Voltage.

This manual describes the mechanical and electrical characteristics of the Microspeed Plus servoamplifier series. It is important that the installation procedures are only performed by qualified personnel in accordance with local safety guidelines.

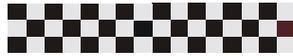
Whoever installs the equipment must follow all of the technical instructions printed in this manual.

For more information, please contact AXOR's technical department.



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4) Start up procedures

 4.0 Preliminary Checks 43

 4.1 Starting Procedures 43-44

5) Adjustments

 5.0 Personalization and Settings 45

 5.1 Adjustments on Personalization Base 46-47

 5.2 Solder Bridges 48-49

 5.3 Speed Adjustments with D.T. Feedback 50

 5.4 Speed Adjustments with Armature Feedback 51-52

 5.5 Speed Balance Adjustments (Offset) 52

 5.6 Nominal and Peak Current Adjustments 53

 5.7 Ramp Time Adjustments 54

 5.8 Dynamic Constant Adjustments 55-56

6) Troubleshooting

 7.0 Troubleshooting 57

7) Option

 7.1 Option Encoder 58-61

 7.2 Option PWM + DIR 62-63

 Conformity Declaration 64



1.0 Security standards



Danger Sign

This symbol is used where security directives should be adhered to, where substantial risks are involved, and where life endangerment or injury could occur.

Installers must scrupulously adhere to prescribed directives and must communicate them to the users.



Warning of Current being present

This symbol warns the user/installer to pay particular attention to the presence of dangerous voltage (up to 270Vdc).

It's recommended to always remove drive from the power supply net before working on the drive.



Warning

This symbol is present in all particularly important points.

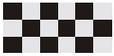
It's used where the intent is to highlight useful considerations, prescriptions, indications, and the correct execution procedures of every type of intervention and prevention of damaging both systems and drives.

General Security Directives

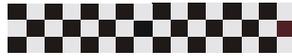
Along with what is prescribed in the manual, pay attention to the security directives for prevention of accidents and risks.

Always remove the power supply (disable) from both the system and the drive prior to any type of intervention on electric or mechanical parts.





General Description



The Microspeed Plus must only be installed by trained, qualified and authorized personnel.

Any intervention or modifications effected on Microspeed Plus, and their components or accessories, constitutes loss of guarantee.

Isolate the drive from the power supply net before removing it (by removing fuses or turning off the principal power switch).

The drive is equipped with electronic protections that deactivate it in case of abnormalities, therefore the motor becomes uncontrolled; this could cause the stoppage or idle motor (for a period determined by the type of system used).

In some cases the drive could restart automatically when the reason for blockage is corrected.

In this case, some systems could be damaged or destroyed endangering the welfare of personnel.

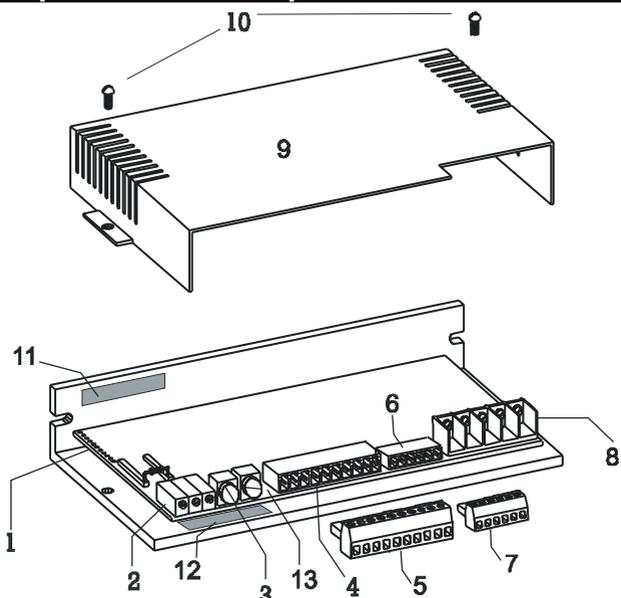
In this case the user must remove the drives' and systmes' power supply so that the motor cannot automatically restart or prevent such an event in the controller's program.

The Microspeed Plus terminals must always be grounded as per the instructions in this manual.



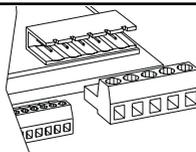


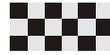
1.3 Microspeed Plus Description



- 1 Calibration Area
- 2 Calibration Potentiometers
- 3 Hexadecimal Rotating Switch
- 4 10 poles 5.08 Phoenix Signal Terminals.
- 5 10 poles 5.08 Extractable Phoenix Terminals.
- 6 6 poles 3.81 Phoenix Signal Terminals.
- 7 6 poles 3.81 Extractable Phoenix Terminals.
- 8 Power Terminals AUGAT
- 9 Product Cover
- 10 Fixing screws
- 11 Serial Number
- 12 Product ID Label
- 13 Tacho Test point (Tachometric signal)

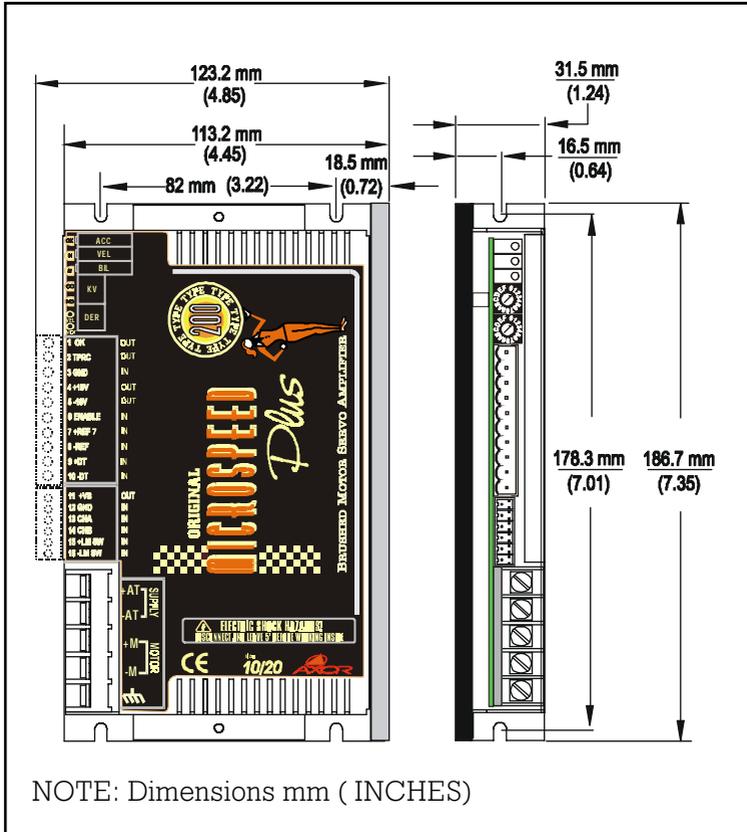
The power connector "AUGAT 6PCR-05" is used on sizes 10/20-14/28 e 20/40A.
Power terminals "Phoenix GMSTB2,5/5-G" 7.62 for Microspeed Plus sizes 1/2 2,5/5 6/12 .





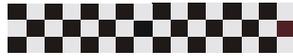
1.4 Drive Dimensions

MICROSPEED PLUS

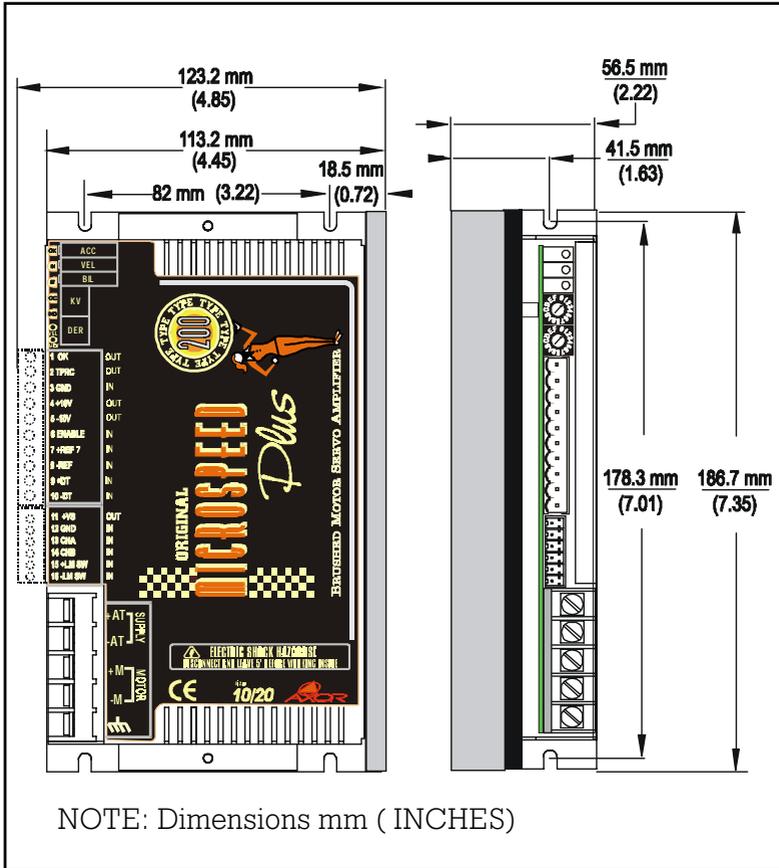




General Description

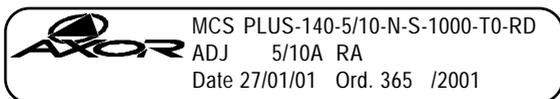


MICROSPEED PLUS WITH BOOSTER





1.5 Drive Label Description (example)



The Product Label is on all MICROSPEED PLUS drives. The Label printed above is a typical example. To identify the various options see below: Product type and Identification:

ORDERING CODE

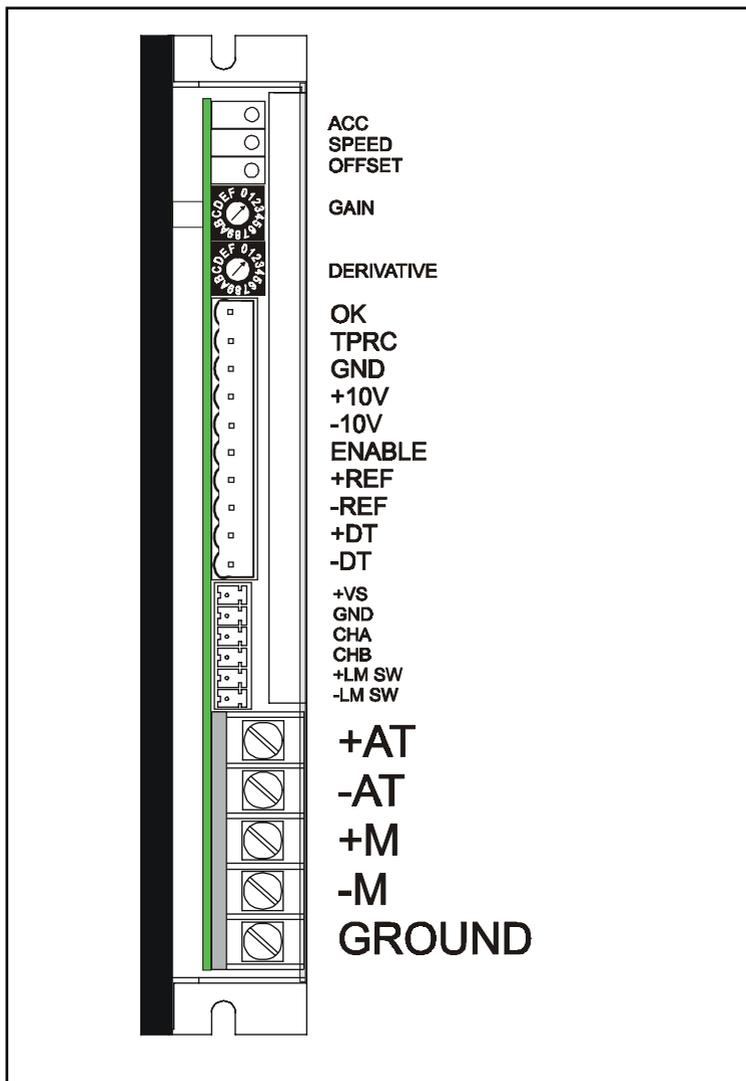
Name:	MCS PLUS
Model:	060-140-200
Size:	01/02- 2.5/5 -06/12 -10/20 -14/28 -20/40
Heatsink:	N=Normal, B=Booster
Protection:	S=Standard, T= Tropicalized
1000:	Axor identification number
Feedback:	T0= Tachogenerator, A0=Armature, E0=Encoder
Control mode:	RD= Rifferential mode, I0= Demand current, PD=Pwm+Dir

ADJ is the identification of specific adjustments on the product for specific motors. If the product is furnished Standard, the ADJ will show the disbursed current.

ORD is AXOR's internal order number which relates to product distribution. Always quote this number when asking for technical assistance.

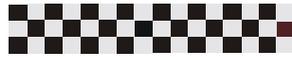


1.6 Connections





General Description



C) **Current Reference** (Torque Input):

S8 open S9 closed.

Range: +/- 10V, which corresponds to the drives peak current output.

In this mode the velocity loop is automatically disabled.

3 GND

Drive Common Ground. Corisponds to power supply's negative -AT input.

4 +10V(OUT)

Power Supply +10Vdc 4mA Max.

5 -10V(OUT)

Power Supply -10Vdc 4mA Max.

6 ENABLE(IN)

Drive Enable. Range +8Vdc to +24Vdc.

7 +REF(IN)

Reference Positive differential input. (Velocity command)

8 -REF(IN)

Reference Negative differential input. (Velocity command)

9 +DT(IN)

Positive Tacho input + (Connect to internal GND)

10 -DT(IN)

Negative Tacho input -

Continued





1.7a Signal inputs and outputs (6 poles)

Note: The inputs 11-12-13-14, are enabled if the Encoder Option is present.

11 +V(OUT) Power supply encoder (Optional)

+5Vdc 250mA Max. = (Solder bridge S13 closed).

+12Vdc 250mA Max. = (Solder bridge S13 open).

12 GND

Drive Common Ground. Corisponds to power supply's negative -AT input.

13 CHA(IN) (Optional)

Encoder input Channel A

High logic level from +3,2V to +24Vdc.

Low logic level < 1,5V.

14 CHB(IN) (Optional)

Encoder input Channel B

High logic level from +3,2V to +24Vdc.

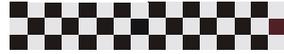
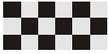
Low logic level < 1,5V.

15 +LM SW (IN)

Logic input that , disable with positive rotation (CW) of motor.(Motor limit).

Such a function is enabled, by open soldering point S10 and connecting a positive Voltage (between +5Vdc e +24Vdc) on said input. When the voltage on said input is absent, motor rotation blockage intervenes in a clockwise sense. See Chapter 3.10





Continued

DER

Derivative potentiometer. Turning this potentiometer clockwise decreases motor overshoot.

Note: Potentiometer is disabled in torque mode.



NOTE:

On the Microspeed Plus the KV and DER functions are constituted by Hexadecimal rotating switch indentified with numbers from 0 to F.

With 0 you have the minimum function attainable, and with F you receive the maximum.

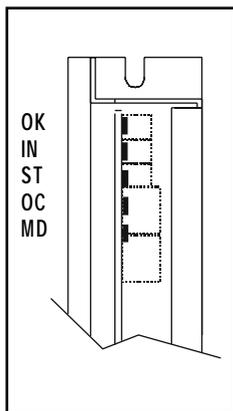
WARNING: Increase the gain of KV and DER in the progressive mode using the various intermediate positions 1-2-3-4 etc.

Therefore, "turning counter-clockwise from position 0 to position F" the motor could begin vibrating.





2.2 L.E.D. indicators



Five LEDs are located just in front of the potentiometers and show the current state of the drive.

-OK (GREEN) Normally ON. This indicator shows that the drive is operating correctly. If this LED is Off, it is indicating at least one fault has been activated. The faults that affect this LED are:

- Over/Under input voltage.
- Over temperature, Over 104°F (40°C).
- Short Circuit, Outputs shorted to each other or to ground.--Missing Tachogenerator or Encoder

- IN (RED) Normally OFF.

This indicator is lit if the drive is in Over current mode.

- ST (RED) Normally OFF. This indicator is lit when the drives internal temperature reaches the max.value. Remove power and wait for the drive to cool before re-applying power. If operating temperatures are close to the Max operating temperature of the drive, a fan, heat sink or air conditioner may be needed to remedy the problem.

- OC (RED) Normally OFF. This indicator is lit if there is a short circuit between the motor leads and/or ground. Remove power and examine the motor connecting leads for shorts before re-powering the drive.

- MD (RED) Normally OFF. This indicator is lit for a loss of tachogenerator/Encoder signal, or tachogenerator/Encoder signal reverse.





3.0 Installation Notes

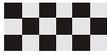
The Microspeed Plus is predisposed for mounting inside a box. The mounting hole measurements can be found in chapter 1.4 "Drive Dimensions". The Microspeed Plus must be fixed vertically on the bottom of the box to guarantee efficient cooling by the drive itself. The positioning inside the box must satisfy the following dispositions:

- For best results from drive guarantee that inside the electrical box a temperature between 0°C and +40°C with humidity between 10% and 95% without condensation..
- Keep the drive from excessive mechanical vibrations in the electrical box.
- During installation, insure avoiding any kind of metallic residue from falling inside of the Microspeed Plus.
- Maintain a distance of 80mm from the heat source.
- The electrical box must have a predisposition for opportune air filtering holes or passageways.

3.1 Ventilation

The Microspeed Plus must be affixed vertically on the bottom to guarantee efficient cooling. The drives working temperature must be between +0° C and +40° C. Supplementary ventilation may be requested in accordance to size. See the table below.

Model	1/2	2.5/5	6/12	10/20	14/28	20/40
60	n.a	n.a	n.a	n.a	NV	NV
140	N	N	N	N	NV	NV
200	N	N	N	NV	NV	BV



Combination table of dissipators present on Microspeed Plus.

n.a = Unavailable size with Microspeed Plus. (Available with Microspeed Case PM1)

N = Microspeed Plus with normal radiator (See Chapter 1.5)

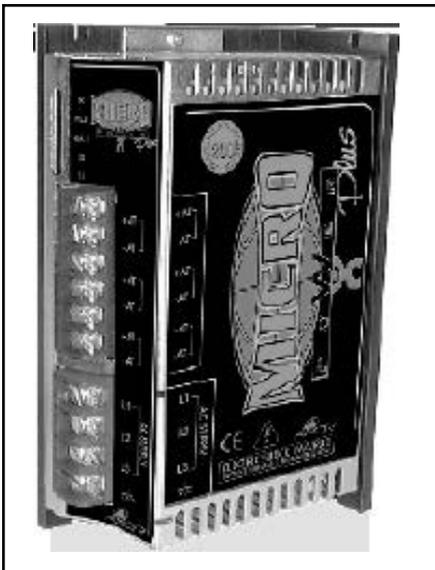
B = Microspeed Plus with added radiator Booster (See Chapter 1.4)

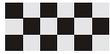
NV = Microspeed Plus + supplementary ventilation.

BV = MicrospeedPlus with added radiator Booster + supplementary ventilation.

Power Supply MicroPower Plus (optional)

An optional Power Supply MicroPower Plus is available with the Microspeed Plus amplifier. This Power Supply is complete with power bridges, capacity filters, and breaking modules with internal breaking resistors. The MicroPower Plus can power several amplifiers (typically 3). See relative Data Sheet.

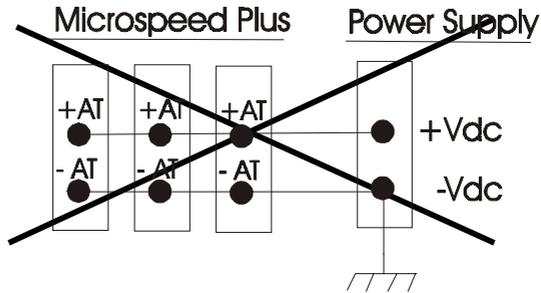




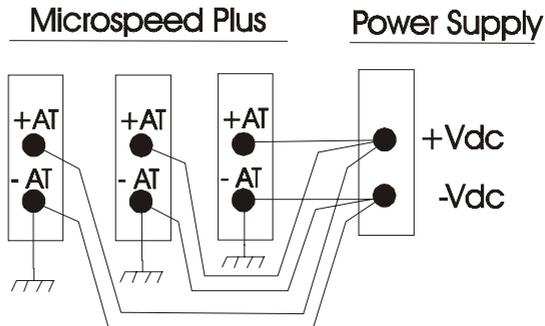
3.3 Multiple Connections

In case of connecting more than one axle to a single supply, always connect each drive **DIRECTLY** to the supply and keep the wires as short as possible, twist the + and - leads together as twisted pairs. (try not to exceed 1,5 feet (1m) in length).

Incorrect Wiring Technique

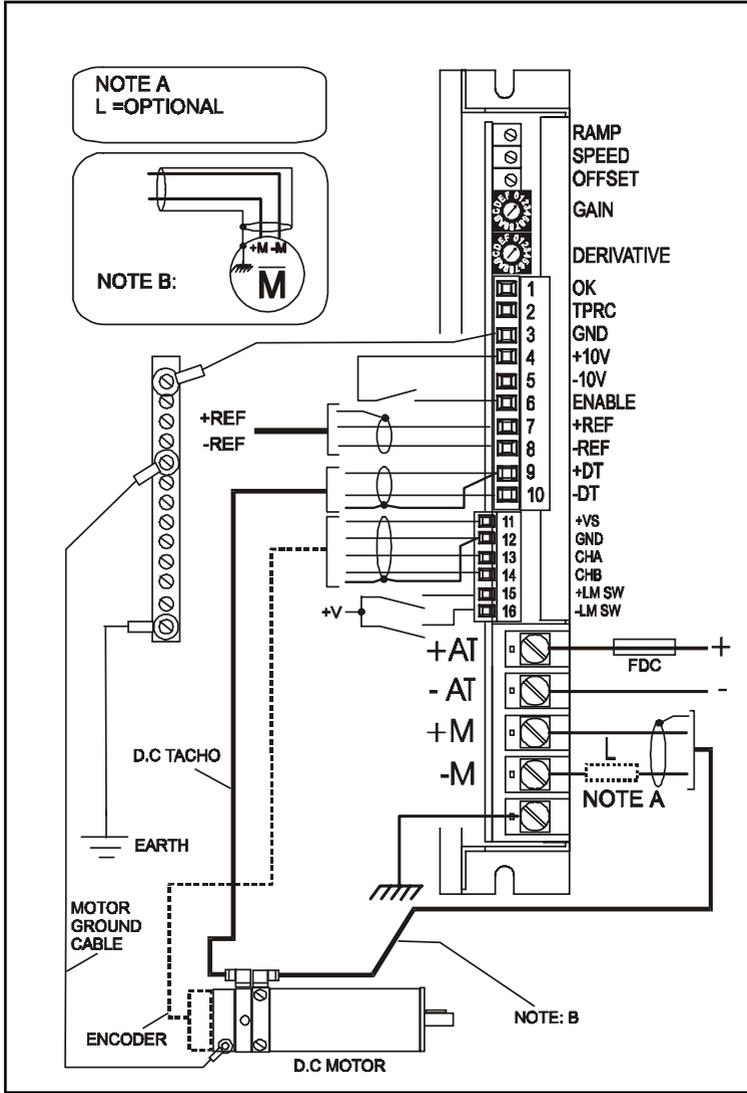


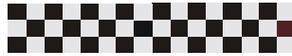
Use This





3.4 Ground and Shield Connections





Description:

It is important that the drive's ground connections are as short as possible and no longer than 8 inches (20 cm). The figure shows the connection using terminals fixed to the drive's base (bottom). This connection also reduces disturbances in the net.

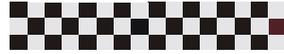
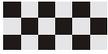
The Motor ground cable has to be external (not inserted in a multipolar cable) with minimum section 1.5 mm² (0,059 square inch).

Drive power and signal cables must be shielded. The cable shields must be connected to the body of the motor.

Shielded cable is not required for the motor power cable, the +M and -M cables should be twisted together.

On the following page you'll find additional installation instructions in respect to EMC requirements.





Instructions for EMC requirements (continued)

The TIMONTA FSS2-65-3 TIMONTA FSS2-65-6 : Single PHASE Series filters are furnished with Fast-on connectors for both input and output.

Max. voltage : 250Vac

Max. current : 3A @ 40°C,

Max. current : 6A @ 40°C

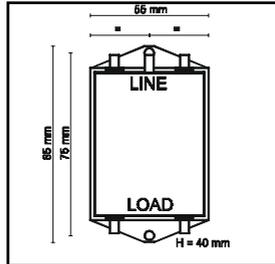
The SCHAFFNER FN2070-3: Single PHASE Series filters are furnished with Fast-on connectors for both input and output.

Max. voltage : 250Vac

Max. current : 3A @ 40°C

Working temperature: -25° +85°C

Mechanical dimension



NOTE:

- The filter must be placed before the transformer.
- All connections of the Net filters must be shielded and shouldn't be longer than the length shown in the scheme.
- The cable shield must cover the entire length of the wire and be as close as possible to the connection terminals.
- Always use shielded cable (twisted) to connect the motor and the drive.
- Avoid passing signal and power cables through the same channels.
- It is very important that the panel where the filters are mounted is connected to ground.
- Power and Command/Signal conductors should not be placed in the same channels (keep separate). Avoid twisting, crossing, etc. If crossing is inevitable, try to cross at a 90 degree angle. Where possible use metallic channels connected to ground.

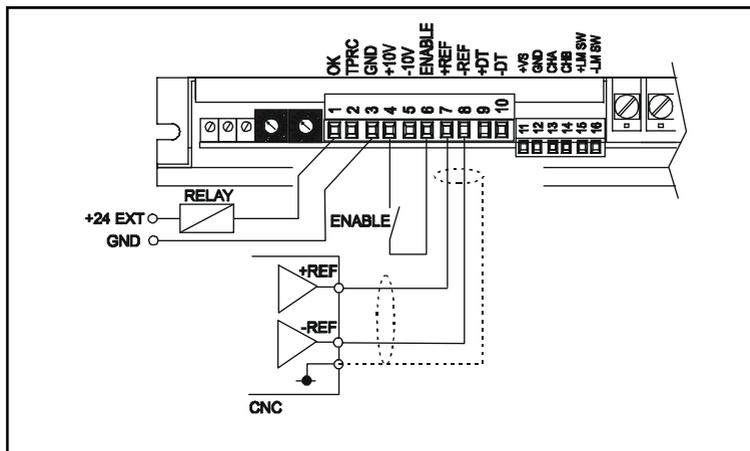




3.6 Examples of Microspeed Plus Connections

The following diagram shows an application utilizing a differential reference from a C.N.C.

The drive is enabled using the Auxiliary power supply +10V (Connector 4). It is possible to use an external power supply for this function (24Vdc). Remember to also connect the GND of the power supply to Connector 3.

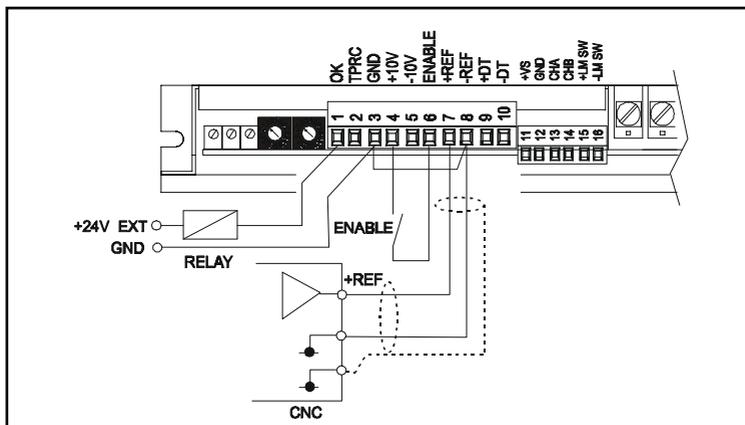


On connector 1 "OK" an external relay coil was connected. This output has a rating of 50mA Max. Do Not connect a supply exceeding 24Vdc. Connect the Power Supply GND externally using connector 3.

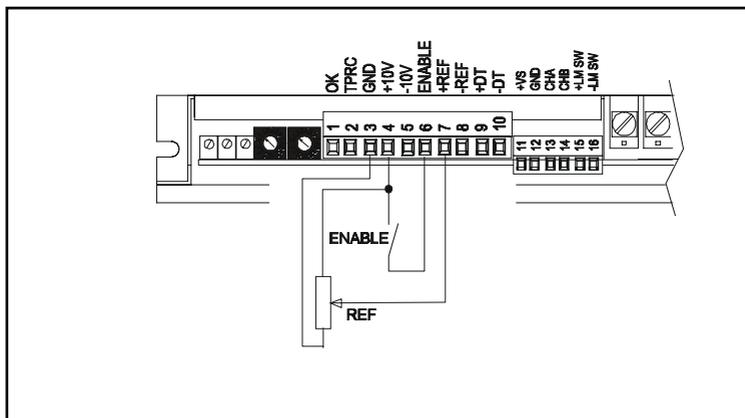


3.7 Common Mode Reference

The following diagram shows an application using speed reference connections in the Common Mode.



The following figure shows an application with speed reference connections using an internal MICROSPEED PLUS power supply. The speed potentiometer must have an included value between ≥ 10 and ≤ 47 Kohm.





3.8 Current Reference (Torque Mode)

With a voltage output (ex. from a CNC) you can command the drive in torque mode. Applying a signal of +/- 10V at TPRC, the MICROSPEED PLUS to supply positive or negative peak current. For this configuration soldering point S8 is closed, S9 and S12 is open.

The formula to determine the value of V_{ing} to apply in TPRC in order to obtain requested current is the following:

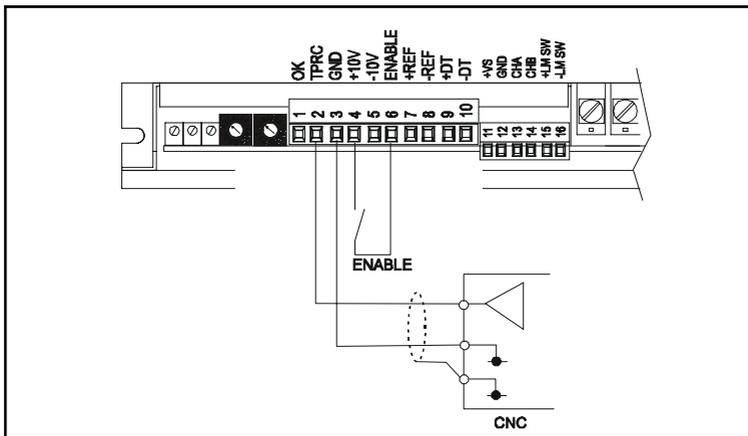
$$V_{ing} = \frac{10 \times I_{request}}{I_{pk} \text{ MCSP}}$$

Ex: $\frac{10 \times 9}{28} = 3,2V$

Other examples:

Mcs Plus10/20A..... +5V gives current of -10A.
..... - 5V gives current of +10A.

Mcs Plus14/28A..... +3.2V gives current of -9A.
..... - 3.2V gives current of +9A.



In this case the loop of internal velocity automatically excludes itself .





3.9 Current Output Limitation

With a voltage output (ex. from a CNC) only positive between 0V and +10Vdc, you have a limitation of output current (from zero to max. size) drive's.

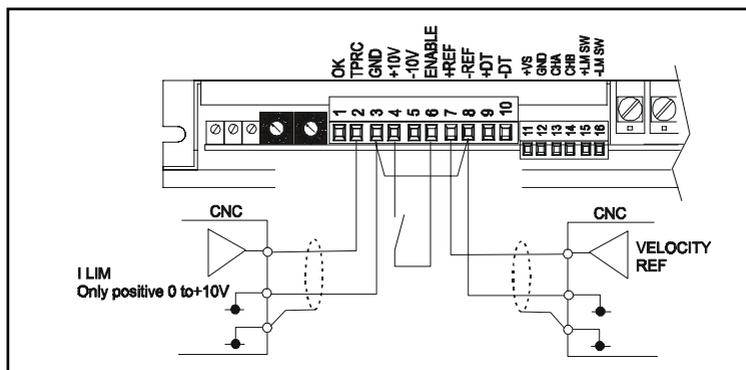
For this configuration the soldering point S8 is open, S9 closed. The speed ring remains active and uses the input reference signal.

Example:

Mcs Plus 10/20A..... +5V limits the current to +/-10A.

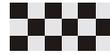
Mcs Plus 14/28A..... +3.2V limits the current to +/-9A.

The current polarity functions as speed ring output.



In this case the loop of internal velocity remains active.





3.9a Current Output Limitation (continued)

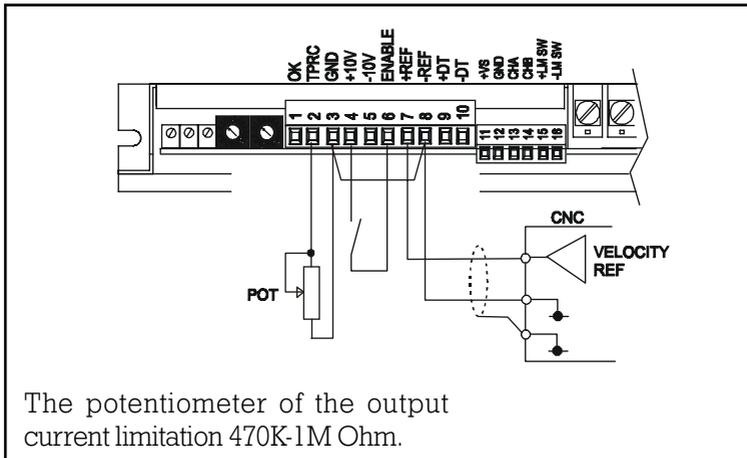
By connecting a resistance load at TPRC (ex. a potentiometer), you'll obtain the limitation current output.

For this configuration soldering point S8 is closed, S9 is open. Connect a resistance of 1/4W - 1/8W between the TPRC terminal and the GND terminal, or a potentiometer connected as in figure 5.

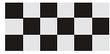
With external Resistance of 47K you limit the current at 50% of I Max. of size.

Example:

Mcs Plus 10/20A.....47Kohm limits the current to +/-10A



In this case the loop of internal velocity remains active.



3.10 Limit Switch Input +/-

It's possible to enable clockwise (CW) and counter-clockwise (CCW) motor rotation by connecting the +LM SW and -LM SW inputs.

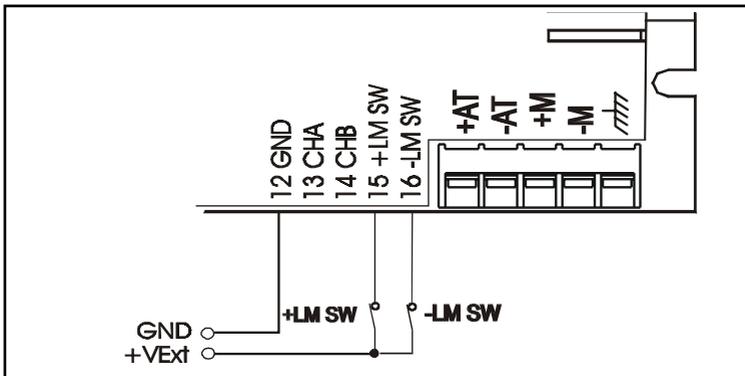
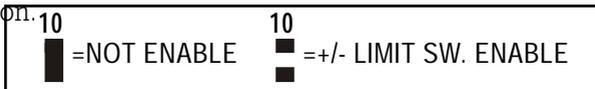
They may be used to block motor rotation when the machines overflow contact is intercepted.

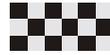


Note - When one of these said contacts is intercepted the motor stops with the required inertia.

The Enable input in regards to this input always has priority. To enable such a function, you must:

- Open soldering point S10
- Open soldering point S12 (disable a internal allarm for missing tachogenerator or encoder).
- Then connect on said input a positive voltage (between +5Vdc and + 24Vdc) coming from -for example two N.C. contacts. You may connect an external supply "combining negative" as well as from one of the supplies furnished on the Microspeed Plus. Function: At opening one of the following contacts you enable the motor rotation in the corresponding direction.





3.11 Power Connections

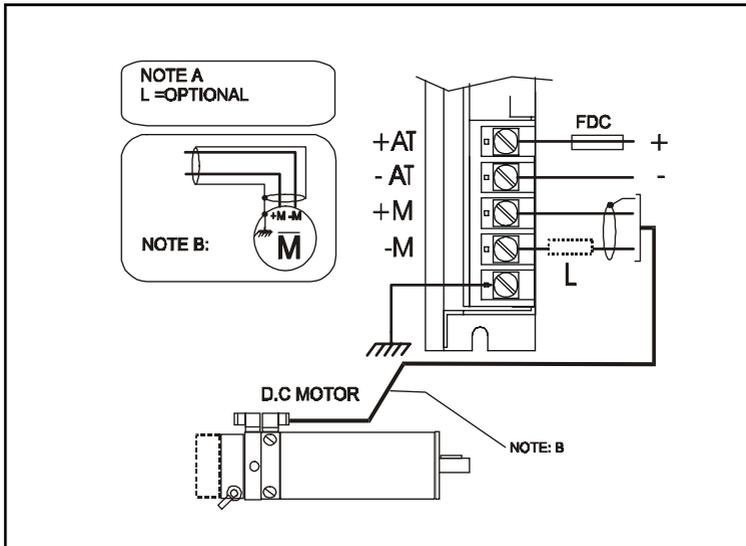
Power cable specification is recommended as follows:

1.5 square mm up to 6/12

2.5 square mm up to 10/20

The +M and -M drive outputs can be connected directly to the motor terminals.

The minimum motor inductance value is 0.5 mH. In the case of motors driven with armature inductance lower than 0.5 mH, it is necessary to use a chokes connected in series with the motor.





4.0 Preliminary Checks

The standard drive is furnished with the following characteristics:

- Nominal and Peak current of drive corresponds to the drive size; "RIN and RIP resistors are not mounted".
Ex.: Microspeed Plus 140 10/20A ; 20A peak for 2 seconds, 10A upon return.
- Encoder speed adjustment for 3000 rpm at 10V ref. with encoder of 1000 Imp/rev. "RDT resistor = 22Kohm".
- KV and DER positions are "1".

How to proceed

Two ways to place the Microspeed Plus into function:

- If the drive has already been pre-adjusted for its motor and has accompanying connection sheet, proceed with chapter on "Starting procedures".
- If the drive hasn't been pre-adjusted for its motor, first consult the chapter on "Personalization and Settings" and Chapter 5.0

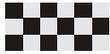
What to check

Verify that all signal and power connection terminals are accurately closed/tightened and execute a visual check of the drive's cabling.

4.1 Starting Procedures

- Remove load from motor shaft and be prepared to quickly shut off power supply if required. (Warning: keep motor well fixed to the ground/floor or attached to a mechanical support).
- Insert the fuses in series with alternating power or insert the corresponding thermal magnet, insuring the available power value by measuring with a tester.





Adjustment components (Continued)

CKV Capacitor value that form the proportional/integral network of the velocity Loop gain.
Standard values is 47nF, there are disabled by opening Solder bridge S5.

CDER Derivative constant capacitor, increases the velocity loop derivative constant.





S8 Normally open. (See chapter 3.8, 3.9, 3.9a)

S9 Normally closed. (See chapter 3.8, 3.9, 3.9a)

S10 Normally closed. (If open predisposes input function +/-LM SW). Chapter 3.10

S11 Normally open.If closed enables Encoder Feedback. See chapter 7.1

S12 Normally closed. If open you disable a internal allarm for missing tachogenerator or Encoder.

S13 Normally closed. (Power supply on terminal +Vs=5Vdc. If open configure +V= +12Vdc).
Only for Optional Encoder.

S14-S15 Normally open.If closed you insert for each encoder input a pull-up resistor of 3.3 Kohm to internal +14V.
Only for Optional Encoder.

S16- S17 Normally open.If closed you insert for PWM and DIR input a pull-up resistor of 3.3 Kohm to internal +14V.
Note: Closed only for Pwm+Dir Optional.

NOTE: Further along in the manual all desired speed feedback are highlighted the soldering points to close.





5.4 Speed adjustment with Armature feedback

RCA resistor It will be mounted on the socket , to compensate for the voltage drop due to the motor's internal resistance. To calculate it, use this equation:

$$RCA \text{ (k ohm)} = 0,5 \times \frac{n \text{ Ke}}{V_{ref} I_{pk} R_i}$$

WHERE:

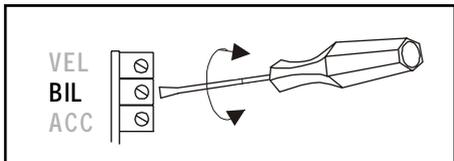
- n= max. speed expressed in rpm.
- Ri= Total motor resistance with brushes.
- Ipk = Peak current, (size) of the drive.
- Ke= Sevomotor BEMF at 1000 rpm.
- Vref= Max voltage reference.

Example: Drive 10/20 A , Ri=2.5 ohm

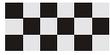
$$RCA \text{ (kohm)} = 0,5 \times \frac{4000 \times 50}{10 \times 20 \times 2.5} = 200 \text{ Kohm}$$

Use a resistor of 200 Kohm or the higher value. If, after this procedure the motor is unstable increase the value by using the next (higher) commercial value available.

5.5 Adjusting Speed Balance (Offset)



The Microspeed Plus is provided with a **BIL** potentiometer that allows the motor to be adjusted to zero speed when 0.0 Vdc is applied to the + REF. Re-adjust the Bil trimmer to correct eventual system offset. (You may compensate +/- 200mV from reference input). With the reference input at Zero turn the **BIL** potentiometer until the motor stops moving.



5.6 Nominal and Peak Current Adjustment

The Microspeed Plus is pre-set to the nominal current rating of the drive, if a lower current is needed to match the motor used, refer to the chart below and select the correct resistor value to be fitted as RIN. Use the table below to select the correct value.

Nominal Current

RIN Value in Kohm	*	33	22	15	10	6,8	4,7	3,3	2,2	1,5	1
MCS 1/2	1	0,96	0,92	0,86	0,78	0,71	0,63	0,55	0,46	0,39	0,32
MCS 2,5/5	2,5	2,3	2,2	2,1	1,9	1,7	1,5	1,3	1,2	1	0,8
MCS 6/12	6	5,8	5,6	5,2	4,8	4,3	3,8	3,3	2,7	2,3	2
MCS 10/20	10	9,6	9	8,4	7,8	7,1	6,5	5,5	4,4	3,8	3,1
MCS 14/28	14	12,5	11,8	10,5	10	9,2	8	7	6	5	4,3
MCS 20/40	20	18,3	17,4	16,4	15	13,5	12	10,4	8,8	7,4	6,2

Note * = No resistor mounted.

To reduce the value of the peak motor current , it's necessary to mount RIP on the header located inside of the drive. Use the table below to select the correct value.

Peak Current

RIP value Kohm	*	68	47	33	22	15	12	10	8,2	6,8	5,6
MCS 1/2	2	1,9	1,8	1,7	1,6	1,5	1,4	1,3	1,2	1,1	1
MCS 2,5/5	5	4,8	4,6	4,4	4	3,7	3,4	3,2	3	2,7	2,5
MCS 6/12	12	11,5	11,1	10,6	9,8	8,9	8,3	7,7	7,2	6,6	6
MCS 10/20	20	19,3	18,6	17,7	16,3	14,8	13,8	12,9	12	11	10
MCS 14/28	28	27	26	25	23	20,7	19,3	18	16,7	15,4	14
MCS 20/40	40	37,5	35	33	30	28	26	24	22	20	18

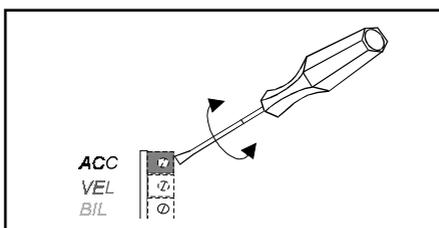
Note * = No resistor mounted.



5.7 Ramp time Adjustment

This function is enabled by solder bridges **S2, S4 (closed)**. It allows adjustment of the ramp slope during both acceleration and deceleration.

Adjusting the ACC potentiometer, located in front of the drive, clockwise (cw) increases the ramp time between 0,1 and 1S (It for a 10V reference). (See figure below)



It is also possible to modify the “range of the ramp” by opening solder bridge **S3** and mounting a resistor (RAMP) with the values shown in the table 2) below.

①

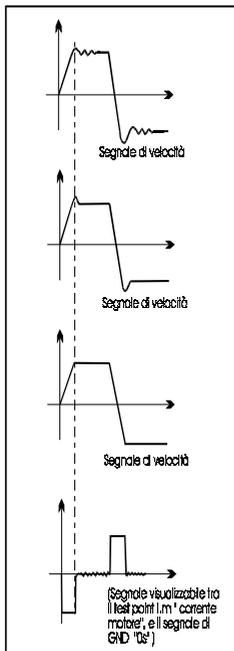
S3	S2	S4	FUNCTION	RANGE	NOTE
Closed	Open	Open	Ramp Disabled	0 Sec.	Standard
Closed	Closed	Closed	Ramp Enabled	0,1 - 1sec	adj by ACC
Open	Closed	Closed	Ramp Enabled	by RAMP	adj by ACC

②

Res. RAMP	680K	820K	1MOHM
TIME	0,2-2,6 Sec.	0,3-3,2 Sec.	0,4-3,9Sec



5.8 Dynamic Constant Adjustments (Continue)

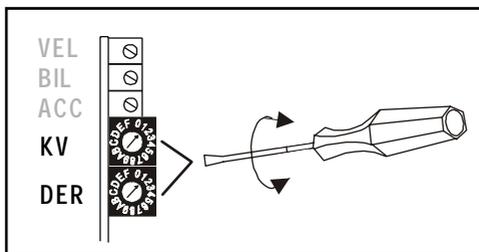


Insufficient proportional gain.

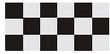
Increase the gain by turning clockwise (cw) using "KV potentiometer" until achieving a situation as shown on the left.

To reduce the overshoot adjust clockwise (cw) using "Der potentiometer" until achieving a situation as shown on the left.

Caution: Do not set KV too high : it can cause unnecessary motor heating caused from oscillating currents in the motor.



It's possible to increase the velocity loop derivative constant by inserting a capacitor CDER on the personalization adjustment.



6.0 Troubleshooting

- 1) When power is on -the green OK LED doesn't come on.
-Check the voltage between +AT and -AT with a multimeter

- 2) With the green OK LED on the motor doesn't run when the drive is enabled.
- Check input signal (Enable-reference)

- 3) When the drive is enabled the green OK LED goes off and the red O.C. LED comes on.
- Short circuit between motor terminals or motor winding is connected to ground. Switch off and measure with tester.

- 4) During motor deceleration phase the green OK LED blinks.
-You've exceeded max. consented voltage. Verify filter capacity value. (See Power Supply chapter).

- 5) During operation the motor stops and the S.T. LED comes on.
-Drive operating temp. is too high (more than 40°C). Ventilation missing (where required).

- 6) At Startup or Enabling the DT Led comes on.
-Missing Tachogenerator Signals or reversal.
-Missing Encoder Signal or reversal.





7.1 Encoder Feedback (option)

The encoder feedback is an option of the MICROSPEED PLUS drive.

This allows you to adjust the motor speed, using a signal coming from an encoder with two channels.

This solution saves the use of a tachogenerator, using the same signal requested for the position control.

The performance of the drive at low speeds are improved with the high encoder resolution. It is recommended that you use an encoder with resolution of at least 500 imp/rev. An auxiliary power supply +5 V or + 12 V is available to supply the encoder.

Don't exceed the load declared.

If the encoder's absorption is unknown, please check it by a milliamperometer connected in series to +Vs.

If the value is higher, please use an external power supply.

Technical specification

<u>Encoder inputs</u>	Push-Pull ,Line-driver, Open-C.
<u>Power supply levels</u>	From 0V to 5 min. 0V to 24V max.
<u>Max. frequency</u>	250 KHz
<u>Encoder power supply</u>	S13 Close Vs= +5V Max 220 mA S13 Open Vs= +12V Max.220 mA
<u>Operating temperature</u>	0 - 40 C°

Terminals description

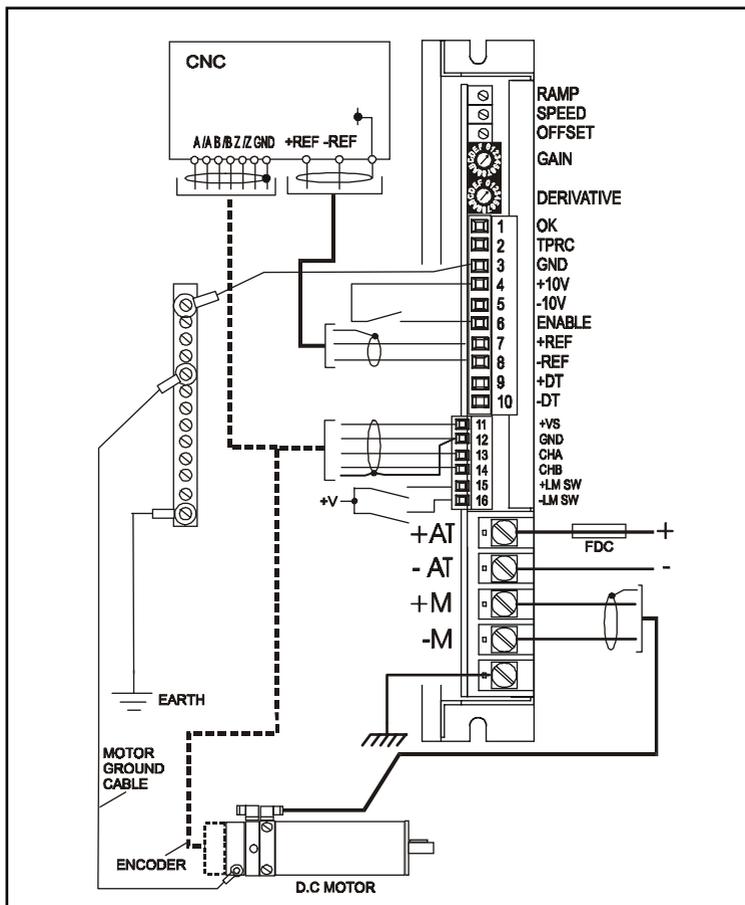
<u>Code</u>	<u>Description</u>	<u>Pin out</u>
11(+Vs)	Encoder power supply +5 /12V	Output
12(GND)	GND Power supply	Input/Output
13(CHA)	Input channel A encoder	Input
14(CHB)	Input channel B encoder	Input

Solder bridge description

<u>Code</u>	<u>Description</u>	<u>Standard</u>
S11	Encoder Feedback Enable	Close
S13	Chose Power Supply	Close
S13	Insert internal res. pull-up (Inp.CHA)	Open
S14	Insert internal res. pull-up (Inp.CHB)	Open



Encoder Connections



The following diagram shows typical connections between the drive and a brushed motor.

The Encoder power comes from the (+V), connector 11.





Speed Adjustment with Encoder Feedback

The Microspeed Plus needs to be set up for the motor and Encoder used to ensure proper operation and speed control.

Use the following formula to determine the correct resistor value to place in RENC. The value placed in RENC is application dependent. Determine what the max. speed of the motor will be and find out what the line count (PPR) of the encoder is before using the formula. This is a two-part formula, the first part gives a factor based on rate, the second part determines the resistor value. Keep in mind when selecting the encoders line count that the Maximum encoder input frequency to the Microspeed Plus is 250Khz. Find the rate factor:

$$F_{enc} = \frac{PPR \times RPM}{60}$$

Where: Fenc = the rate factor

PPR = encoder pulses per revolution (line count)

RPM = Motor Velocity Max.

Calculate RENC:

$$RENC = \frac{680000}{F_{enc}}$$

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

Example:

1000 PPR Encoder

3000 RPM Motor Velocity Max.

$$F_{enc} = \frac{1000 \times 3000}{60} = 50000$$

$$RENC = \frac{680000}{50000} = 13.6Kohm$$

Once the resistor RENC is inserted, proceed with final speed adjustment.

Operate using trimmer VEL on the front of the drive.

Clockwise Rotation.....Speed increases

Counter Clockwise Rotation.....Speed decreases

The Range of regulation is +/- 20%.

You will adapt to the nearest commercial value: 15 or 12Kohm value in 1/8 or 1/4W.



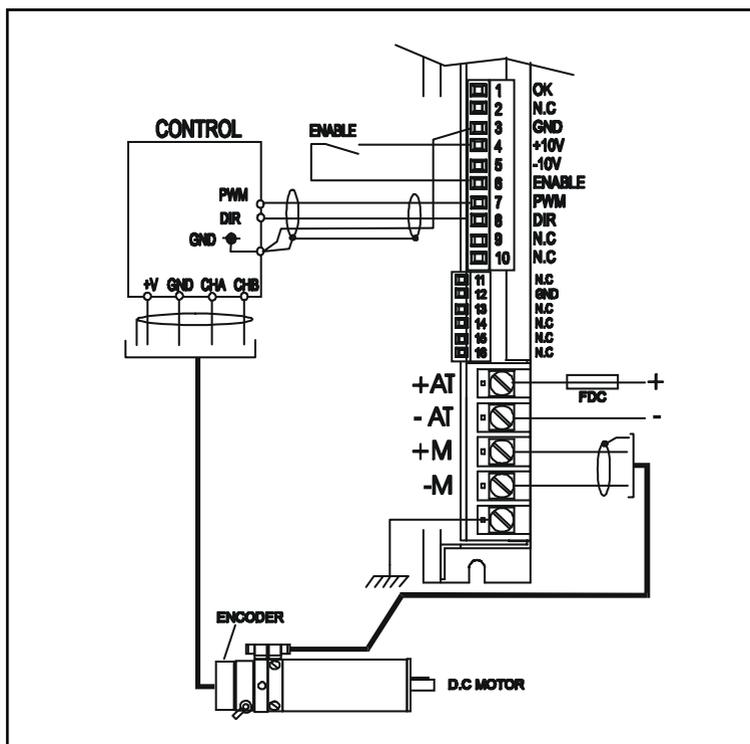


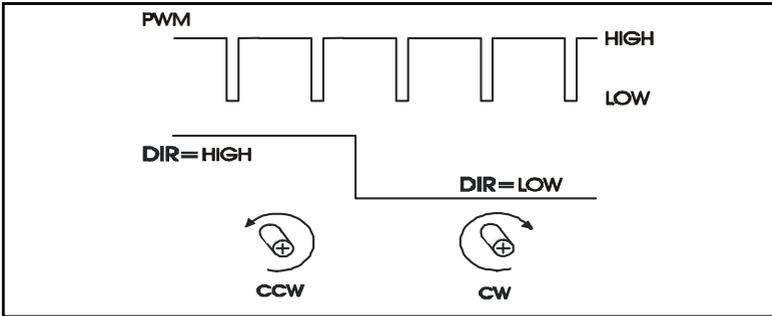
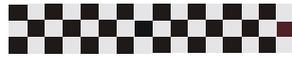
7.2 Command with PWM + Direction (Option)

It is possible to run the Microspeed Plus using digital PWM commands. (Frequency signal in PWM plus direction signal DIR) (see figure).

Such logic signals must be furnished to the Microspeed Plus by a controller **which must be able to elaborate the motor's speed ring** and possibly the positioning ring.

(The signals high logic level PWM and DIR must be between +5Vdc and 24Vdc max.). The Microspeed comes predisposed to function with supported logic signals, also highlighted in the figure below.. The range of PWM frequency is 10 to 20Khz.





--With High PWM logic signal and any DIR logic value you have zero output voltage between +M and -M. (Motor output terminal).

--With logic signal PWM = H and DIR = L you receive clockwise motor rotation.

--With logic signal PWM = H and DIR = H you receive counter-clockwise motor rotation.

NOTE:

--The motor wiring must be connected correctly. (Consult the connections diagram furnished with the motor).

For additional information contact AXOR.

Signal Connector Description.

- | | |
|----------|---|
| 1 | Drive OK, Open Collector output 50mA Max. (Normally closed, opens when in protection mode). |
| 3 and 12 | GND Common zero signal |
| 4 | Auxiliary output voltage +10V, 4mA. |
| 5 | Auxiliary output voltage -10V, 4mA. |
| 6 | Enable (+10/30 Volt drive enabled) |
| 7 | PWM input Frequency |
| 8 | DIR input Direction |

Note: -The other pins connector are N.C

-For the leds indicator, in this option, see Chapter 2.2

-The only active adjustments in this option are RIN and RIP.

-If closed S16 or S17 you insert for PWM and DIR input a pull-up resistor of 3.3 Kohm to internal +14V.





CE CONFORMITY DECLARATION

The manufacturer: AXOR Industries
Address: Viale Stazione 15, 36054 Montebello
Vicentino (VI) ITALY

DECLARE under their own responsibility that the following line of products:

series **MICROSPEED PLUS** with the relative options and accessories installed in accordance with the operating instructions furnished by the manufacturer, conform to the provisions of the following directives, including the latest modifications and all relative national issued legislation:

Machine Directive (89/392, 91/368, 93/44, 93/68)

Electromagnetic Compatibility Directive (89/336, 92/31, 93/68) And that the following technical standards were applied:

*CEI EN 60204-1 Safety of machinery – Electrical equipment of machines – Part 1: General requirements.
CEI EN 60439-1 Low-voltage switchgear and controlgear assemblies – Part 1: Type-tested and partially type-tested assemblies.*

CEI EN 61800-3 Adjustable speed electrical power drive systems – Part 3: EMC product standard including specific test methods.

Recall: CEI EN 61000-4-2 CEI EN 60146-1-1.

CEI 28-6 Insulation co-ordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests.

CEI 64-8 Electrical system users of nominal voltage not exceeding a 1000V.alternate current and a 1500V continuous current.

Montebello Vicentino, 19 December 2000 Management





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