340 / 680 / 1220
DC Motor Controller
Product Manual

This drive is a speed controller for shunt wound or permanent magnet motors. It utilises speed feedback from the armature voltage, or from a shaft mounted tachogenerator. It incorporates an accurate current control loop to protect the drive and motor. **The unit is a non-isolated component.** Please obtain expert help if you are not qualified to install this equipment. Make safety a priority. **This component is hazardous.** (All specifications in this document are nominal).

POWER RATING

340	0.55KW (0.5 HP) at 180 Volts DC
680	0.75KW (1.0 HP) at 180 Volts DC
1220	1.8KW (2.0 HP) at 180 Volts DC

(The KW / HP ratings are typical motor ratings at or below the available terminal rating of Watts= AV x IA)
Versions that work from 60V / 30V AC supply are also available.
340 / LV60, 680 / LV60, 1220 / LV60. For motors rated up to 48V DC

MAXIMUM OUTPUT

Armature: 200 Volts DC. 48V DC for LV60 models
Models 340 / 680 / 1220 --- 3.4 / 6.8 / 12.2 Amps.
Field: Volts DC= 0.9 x AC supply volts. 1 Amp
(0.45 x AC for field connected to F- and N). 1 Amp.

AC SUPPLY INPUT

110V AC or 240V AC +/-10%, 50-60 Hz.
30V AC or 60V AC +/-10%, 50-60Hz for LV60 models.

SPEED RANGE

Speed range 0-100%. (motor dependant)
Load Regulation typically 0.2% tach, 2% Arm Volts.

USER ADJUSTMENTS

Presets accessible under lift up cover.
Clockwise rotation for linear increase in parameter

Maximum Speed	**(Max spd)**	40 to 200V (armature volts or tach feedback volts) LV60 models have an Avf range 10 - 50V.
Minimum Speed	**(Min spd)**	0 to 30% of maximum speed
Ramp	**(Ramp)**	20 to 1 seconds up ramp rate
IR compensation	**(IR comp)**	0 to 30%
Max Current	**(I max)**	0 to 100% current limit.

EXTERNAL CONTROLS

Speed setpoint from **external 10K Ohms pot.**
External RUN contact for electronic STOP/START

There is a pot kit including graduated dial and knob. Sprint Electric part number. POTKIT.

CONTROL ACTION

Speed loop: Full P+I armature voltage or tach feedback.
Current loop: Full P+I current shunt feedback.

INSTALLATION

Use correctly rated cable minimum 600V AC, 1.5 times armature current.

AC SUPPLY

To avoid damage, ensure the supply selection jumper on the drive matches the incoming supply. **110V or 240V AC.**
For models with LV60 suffix 30V AC or 60V AC.

FUSING REQUIREMENT

Semi-conductor fuse parts.

20A fuse (BUSSMANN FWH020A6F)	CH00620A
Fuseholder 6 X 32mm	CP102071
DIN rail clip for fuseholder	FE101969

Suitable for use on a circuit capable of delivering not more than 5000A RMS symmetrical amperes when protected by an aR class fuse.

WARNING Protection must be provided by a correctly rated semi-conductor fuse, fitted upstream of the drive. The fuse must have an I^2t rating of less than 150 A^2s.

To satisfy UL requirements for branch circuit short-circuit protection the fuse must be as specified above.

CONTROL SIGNALS

Control signals are isolated from the supply, and the unit may be connected to other isolated instruments.

MECHANICAL

The unit is designed to clip onto a DIN rail. Avoid vibration and ambient temperatures outside –10 and +40C. Protect the unit from pollutants. Ensure there is an adequate supply of clean cool air to ventilate the unit and the enclosure it is mounted in. (Dissipation in Watts = 5 x Armature Amps).

MOTOR

Foot mounted motors must be level and secure. Protect motors from ingress of foreign matter during installation. Ensure accurate alignment of motor shaft with couplings. Do not hammer pulleys or couplings onto the motor shaft.

Before running motor, complete the following check list. **(Warning isolate the supply first).**

1) Correct insulation between all motor windings and earth. (Disconnect all drive cables prior to testing).
2) Check inside connection box for foreign objects, damaged terminals etc.
3) Check that brushes are in good condition, correctly seated and free to move in brush boxes. Check correct action of brush springs.
4) Motor vents must be freed of any obstruction or protective covers prior to running.
5) WARNING for reversing systems. To prevent damage do not transpose the armature connections until the motor has stopped rotating.

Please note this drive does not provide motor over-temperature protection. If required, equip your motor with an external thermal sensor device that can remove the supply when activated by over-temperature.

PRESET POT settings

Set the CURRENT preset to approximately match the motor armature rating. Fully clockwise is 100% drive rating. (340 3.4A, 680 6.8A, 1220 12.2A). Fully anticlockwise is 0%. E. g. for a 340 unit a midway setting is 50% ie 1.7A. More accurate setting requires a suitable current meter in series with the armature.

Set all the other presets anticlockwise to start off with.

The preferred strategy for initial commissioning is in armature voltage feedback mode described as follows. Set **Avf/tach** switch ON (left) for armature voltage feedback (AVF) and **Spd x 2** switch OFF (right) for 50V max feedback. For systems utilising tach feedback, remove the terminal 6 tach connection.

POWER ON

Check that the Power lamp lights. Increase the external speed pot slowly maximum. The motor should slowly ramp up to around 40V on the motor armature. If the system is to rely on armature voltage feedback you can now set the correct armature voltage and hence speed by using **Spd x 2** switch and the **Max spd** preset (Clockwise to increase speed).

RAMP and MIN SPEED

The up ramp rate can now be set between 20 and 1 seconds. And the **Min spd** adjusted up to 30%.

IR COMP

Speed droop on heavy loads may occur where armature voltage feedback is used. This is compensated for by clockwise rotation of **IR comp**. Excessive rotation may lead to instability.
IR Comp is not used with tach feedback, leave preset anticlockwise.

TACH FEEDBACK

With tach feedback it is necessary for the polarity to be negative on terminal 6 with respect to terminal 4, and
Avf/tach switch OFF (right). Calculate the maximum feedback voltage from the tach and adjust **Spd x 2** switch and **Max spd** to give the correct speed. (With **Spd x 2** switch OFF (right) **Max spd** range = 40 to 100V. For **Spd x 2** switch ON (left) range = 90 to 200V).

TERMINAL LISTING

WARNING. All terminals are at high potential.
DO NOT TOUCH the terminals or any connected conductor.

1 +10V output. 2mA max. (Use a 10K Ohm pot for external speed reference).
2 MIN SPEED. (Connect to minimum end of external speed pot. 5K Ohms preset to common).
3 SPEED INPUT. 0 to +10V speed input from pot wiper. 39K internal pull down.
4 COMMON.
5 RUN. Internal 12K pull up to 12V. Open to stop, close to COMMON to run. **WARNING. RUN is an electronic inhibit function. The field remains energised, and all power terminals 'live'. RUN must not be relied on during hazardous operations.**
6 TACH input. The tach feedback must be negative with respect to COMMON.

A+	Motor armature +	Typical form factor 1.5 (load dependant).
A-	Motor armature -	
F-	Motor Field –	(No connection required for permanent magnet motors).
F+	Motor Field +	(For half wave field volts 0.45 X AC, connect field to F- and N).
N	AC supply	
L	AC supply	

Terminal tightening torque 4.4in lb - 0.50Nm

ALARM

Models 680 and 1220 use an internal fan for cooling. The **Alarm** lamp will come ON and the drive will electronically shut down if the internal fan fails. The field will remain energised, hence if the machine is to be left unattended for long periods it may cause the field to overheat. There is a pair of solder pads adjacent to Terminal 6. If they are linked then the ALARM is inhibited. The unit may be run at currents below 3 Amps without a fan.

JOGGING

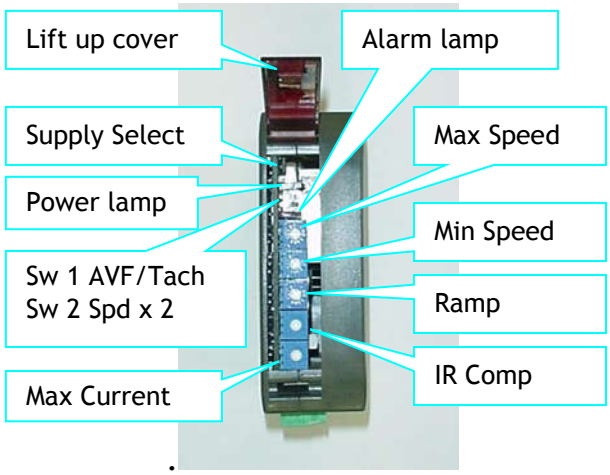
For frequent stopping or jogging it is recommended to use T5 **RUN** input. If you use a mains contactor then connect a spare Normally Open contact on the contactor in series with the RUN input.

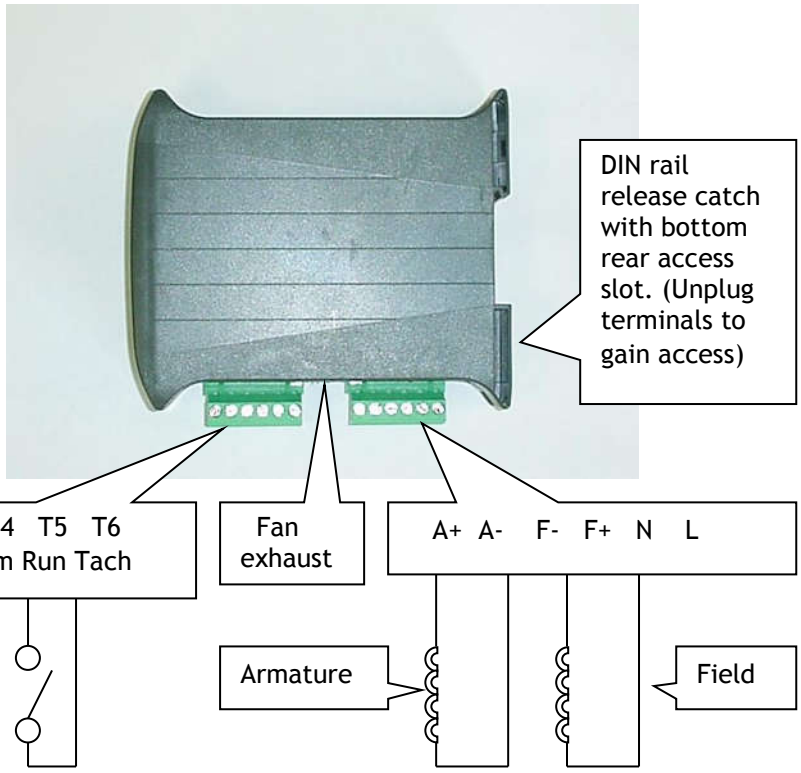
AUXILIARY INPUT

In armature voltage feedback the tach input terminal 6 may used a as an auxiliary fast +/- speed trim. (approx 5 -10%)

MECHANICAL DETAILS

The product is enclosed in a stylish DIN rail mounted enclosure with plug in screw terminal connections.





	Height	Width	Depth
340	105	35	120
680	105	45	120
1220	105	45	120

Earthing The terminals are non-isolated hence do not earth. The motor earth should be connected to the system enclosure earth.

WARNING. This product is non-isolated hence all terminals are at dangerous line potential. Ensure connected items (e.g. speed pot, tach etc.) are not earthed and have sufficient dielectric strength to avoid breakdown. Do not touch any part of the unit. Use an insulated tool to adjust the presets. Do not touch when unit is ON.

EMC WIRING GUIDE

If the unit is to be used in the domestic environment then for installations in the EU a supply filter is recommended in order to comply with EN6800-3. Sprint Electric part number FRLN16. For installation guidelines on wiring for compliance with EU EMC regulations please refer to the Sprint Electric website at www.sprint-electric.com and then 'Downloads', 'Technical Data'.

WARNINGS

Health and safety at work. Electrical devices constitute a safety hazard. It is the responsibility of the user to ensure compliance with any acts or bylaws in force. Only skilled persons should install this equipment. Sprint Electric Ltd. does not accept any liability whatsoever for the installation, fitness for purpose or application of its products. It is the users responsibility to ensure the unit is correctly used and installed.

APPROVALS

This apparatus complies with the protection requirements of the relevant EU directives.

CE

UL file E168302

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