



Product Manual

340XRi

680XRi

1220XRi

SPRINT | ELECTRIC

SPRINT ELECTRIC

This drive is an isolated 4 Quadrant 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, and can be used in speed or current control modes. The drive can operate in forward or reverse, motoring or regenerative braking.

Please obtain expert help if you are not qualified to install this equipment. Make safety a priority. **This component is hazardous.**

POWER RATING

340XRi 0.55KW	(0.5 HP) at 180 Volts DC
680XRi 0.75KW	(1.0 HP) at 180 Volts DC
1220XRi 1.80KW	(2.0 HP) at 180 Volts DC

MAXIMUM OUTPUT

Armature: 200 Volts DC. Field: Volts DC=0.9 x AC. (0.45 x AC F- to N). 1Amp.
Models 340/ 680 /1220/XRi --- 3.4/ 6.8/ 12.2 Amps.

AC SUPPLY INPUT

110V AC or 240V AC +/-10%, 50–60 Hz.

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

Relay driver threshold	0 to +/-100%. (+/-10V). Symmetrical about zero.
Maximum Speed	50 to 200V (armature volts or tach feedback volts)
Minimum Speed	0 to 30% of maximum speed
Up Ramp	1 to 10 seconds
Down Ramp	1 to 10 seconds
Stability	Gain 1 to 10
Current	0 to 100% current limit.
IR compensation	0 to 25%

EXTERNAL CONTROLS

Speed setpoint from **external 10K Ohms pot.**

External RUN contact for electronic STOP/START

+/- channel with pushbutton inputs. Uncommitted relay driver with variable threshold.

There is a pot kit available with graduated dial and knob. Sprint Electric part ref.

POTKIT

CONTROL ACTION

Speed loop: Full P+I armature voltage feedback.

Current loop: Full P+I current shunt feedback.

INSTALLATION

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

FUSING REQUIREMENT

Sprint Electric semi-conductor fuse parts.

20A fuse 6 X 32 CH00620A

Fuseholder 6 X 32 CP102071

DIN rail clip for fuseholder FE101969

WARNING: The drive can only be protected by fitting an external semi-conductor fuse with an I²t rating below 150 A²s.

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 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.

- 1) Correct insulation between all motor windings and earth with all drive cables disconnected.
- 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.

AC SUPPLY

To avoid damage, ensure the supply selection jumper on the drive matches the incoming supply. 110V or 240V AC.

PRESET POT settings

Set the **I_{max}** (Max Current) preset to approximately match the motor armature rating. Fully clockwise is 100% drive rating. (340XRi 3.4A, 680XRi 6.8A, 1220XRi 12.2A). Fully anticlockwise is 0%. E. g. for a 340XRi unit a midway setting is 50% ie 1.7A. More accurate setting requires a suitable current meter in series with the armature. **Set the stability preset midway.** (Clockwise rotation of the stability preset increases gain, excessive rotation may lead to instability). **Set all the other presets anticlockwise to start off with.**

The safest strategy for initial commissioning is in armature voltage feedback mode described as follows.

Set switch 1 ON (left) for armature voltage feedback (AVF) and switch 2 OFF (right) for 50V max feedback. For systems utilising tach feedback, remove the terminal 11 tach connection.

POWER ON

Check that the ON lamp lights. (Note, the ON lamp intensity is reduced to indicate when the negative armature bridge is active). Increase the external speed pot slowly to 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 switch 2 (ON for speed X 2) and the MAX SPEED preset (Clockwise to increase speed).

RAMP and MIN SPEED

The up RAMP rate can now be set between 1 and 10 seconds. And the MIN SPEED adjusted up to 30%. (Note, down ramp becomes up ramp for reverse rotation).

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

The tach feedback signal on terminal 11 must be negative with respect to terminal 10 for a positive speed input, and AVF switch 1 OFF (right). Calculate the full speed voltage from the tach and adjust switch 2 and the MAX SPEED preset to give desired speed. (With switch 2 OFF (right) MAX SPEED range = 40 to 100V. With switch 2 ON (left) the MAX SPEED range = 90 to 200V).

TERMINAL LISTING

WARNING. A+, A-, F-, F+, N, L, are at high potential.

DO NOT TOUCH the terminals or any connected conductor

- 1 **+10V** output. 10mA max. (Use a 10K Ohm pot for external speed reference).
- 2 **MIN** SPEED. (Bottom end of external pot. 5K Ohms preset to common).
- 3 **IP**. Speed input. 0 to +/-10V speed input from pot wiper. 39K internal pull down.
- 4 **OP+/-**. +/-10V range. Input from T6. Invert with pushbutton input T8. Non-invert with pushbutton input T7. 10mA max. (May be used as +/- 10V ref)
- 5 **COM**. Common. (0 Volts)
- 6 **IP+/-**. Input to pushbutton controlled +/- signal channel. OP on T4. 50K Ohms.
- 7 **PB+**. Pushbutton input. 47K Ohm pull up to +12V. Toggles T4 to non-invert when momentarily connected to COMMON T5.
- 8 **PB-**. Pushbutton input. 47K Ohm pull up to +12V. Toggles T4 to invert when momentarily connected to COM T5. (PB- on T8 has priority over PB+ on T7).

- 9 **RUN**. Internal 12K pull up to +12V. Open to reset, 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**
- 10 **COM**. Common. (0 Volts)
- 11 **TACH** input. The tach must be opposite polarity to speed input. 1.5 MOhms.
- 12 **RLOP**. Relay driver. +10V active high 20mA capability. Flywheel diode to COM.
- 13 **RLIP**. Relay driver input. Accepts 0 to +/- 10V signal inputs. The threshold to activate the relay driver is symmetrical around zero, and set by the RELAY preset between 0 and +/-10V. When the T13 input exceeds the positive or negative threshold, then the T12 RELAY DRIVER OUTPUT is turned ON. Typical uses include zero speed detector, zero current detector, stall detector etc.. The input will accept any output provided on other terminals. 50K Ohm pull down to common.
- 14 **OVLD**. Overload. This output goes high (+10.5V) if the current demand exceeds 100% and the stall timer starts timing. Output capability 10mA.
- 15 **TRIP**. This output goes high (+10.5V) and latches high when the stall timer has timed out OR if the fan alarm has operated. Output capability 10mA.
- 16 **ROP**. Ramp output. 0 to +/-10V output for 0 to +/-10V input. 1K Ohm output impedance.
- 17 **DEM**. Demand output. 0 to +/-10V output for 0 to +/-100% speed demand. 1K Ohm output impedance. Represents the inverted total speed demand.
- 18 **SOP**. Speed output. 0 to +/-10V output for 0 to +/-100% speed feedback. 1K Ohm output impedance.
- 19 **IOP**. Current output. 0 to +/-5V output for 0 to +/-100% armature current. Maximum output +/-7.5V for +/-150% current. 1K Ohm output impedance.
- 20 **SPD**. Auxiliary speed input. Input impedance 100K. 0 to +/-10V input for 0 to +/-100% speed demand, direct input fast response.

21 **TRQ.** Torque input. 100K Ohms pull up to +12V.

0 to +5V input for 0 to +/-100% current demand. This input acts as a clamp on the current demand produced by the speed loop. Hence the speed loop current demand polarity determines the sign of the current, and this input clamps the amplitude. Also if the speed loop current demand falls below the input clamp level then the speed loop has priority. For the clamp to operate, the speed loop current demand must be arranged to exceed the clamp level by ensuring the speed demand is high enough.

A+ Motor armature + Typical form factor 1.5

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. 110V AC or 240V AC +/-10%, 50–60 Hz.

L AC supply. 110V AC or 240V AC +/-10%, 50–60 Hz.

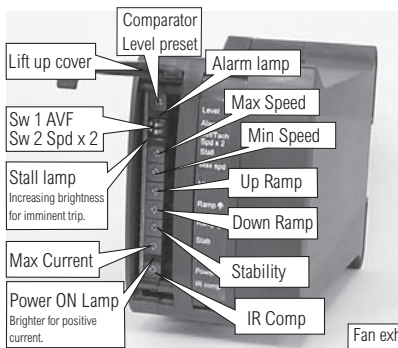
ALARM

Models 680XRi and 1220XRi 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. (TRIP alarm output available on T15).

All models possess a STALL TIMER. This starts to integrate when the current demand exceeds 100%. A continuous demand of 150% will take 30 seconds to saturate the timer integrator and cause the drive to shut down. Demand profiles at lower levels will take longer to trip. A STALL TRIP is indicated when the STALL ALARM is latched on and the drive is shut down by the alarm. The LAMP will get progressively brighter as the timer integrator fills up. (TRIP alarm output available on T15).

MECHANICAL DETAILS

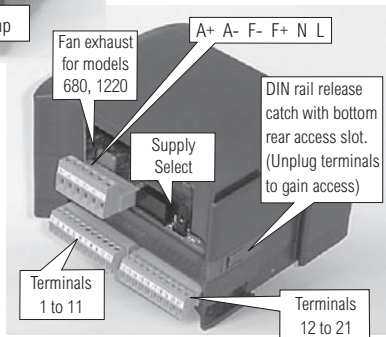
The product is enclosed in a stylish DIN rail mounted enclosure with plug in screw terminal connections.



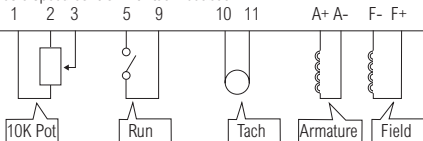
Dimensions

	Height	Width	Depth
340i	105	60	120
680i	105	70	120
1220i	105	70	120

For Forward / Reverse operation connect top of speed pot to T4 and Connect T1 to T6. The pushbutton inputs T7/8 can then be used for direction control.



Basic speed control with tach feedback.



JOGGING

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

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.



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HG102909 ISS1

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