

WARRANTY

Fenner Electronic Controls guarantees this device against defects in workmanship and materials for a period of two (2) years from the time of purchase. Any parts or components which fail during the warranty period will be replaced or repaired without charge. This guarantee is void if damage to the device has been caused by accident, careless handling or tampering.

When a device fails to function in accordance with standards set forth in the Instruction Manual, the purchaser should contact Fenner Electronic Controls. The choice of whether the repair or adjustment will be done at the factory or in the field is solely the prerogative of Fenner Electronic Controls.

If inspection reveals defects caused by faulty materials or workmanship, the manufacturer reserves the right either to rebuild the device using new or refurbished and warranted parts and components or to replace the device with a new device, in any event returning to the purchaser a device meeting full factory standards for new performance.

Parts and services outside the scope of this Warranty will be furnished at Fenner Electronic Controls established charges then in effect.

The statutory rights of consumers are preserved throughout.

Subject to the above statement the J. H. Fenner and Co. Limited General Conditions of Sale will govern all contracts.

Fenner Electronic Controls reserves the right to make changes or improvements in its device without imposing any obligation upon itself to make such changes or improvements in the similar products previously manufactured.



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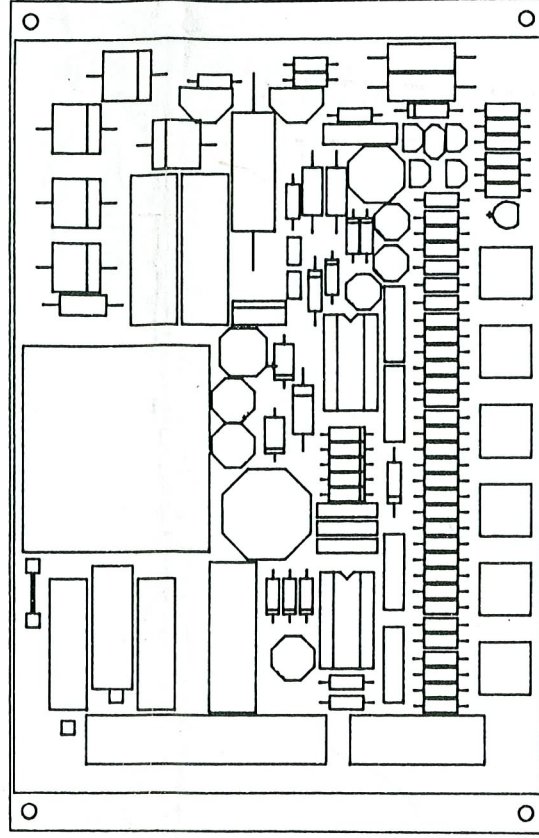
Electronic Controls

INSTRUCTION

MANUAL

SPEEDRANGER 2020

DC motor controller



1 phase 220/240 volt input

0.18-0.37 kW output



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Thank you for your purchase of a Fenner **SPEEDRANGER 2020**.

Please note that satisfactory performance depends on proper installation and operation and therefore ...

ALL instructions in this manual must be carefully followed.

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1.0 INTRODUCTION

The Fenner **SPEEDRANGER 2020** motor speed controller (0.18–0.37Kw) is powered from a single phase (line–neutral) supply and is suitable for use with either standard shunt wound or permanent magnet motors.

The unit can be operated in armature voltage feedback mode (A.V.F.B.) or in tach feedback mode (T.F.B.).

Standard features include variable acceleration/deceleration rates and current or torque limit.

Controller Specification and Limits

Input Supply Requirements:

Input Voltage
Number of Phases
Frequency

220/240V ac + 10%.
Single, line to neutral (line to line optional).
50/60Hz.

Nominal line input current
for fusing and cable rating.

See table below.

Output Voltages and Currents:

Nominal maximum output
voltage to armature

180V dc.

Controller Current Ratings

Unit Size	Kw hp	0,18 0,25	0,37 0,5
RMS input line currents for fusing and cable rating	A(rms)	34	6
Full load motor armature current	Ad.c.	1,5	3
Internal Semi-conductor fuse rating	Amps	8	8

Nominal range of current limit setting 0–136% of full load current.

Nominal output voltage to motor field 210V dc.

Maximum available output field current 0.5 Ad.c.

Limits on operating conditions:

Ambient temperature range –10°C to +40°C.
Maximum altitude above sea level 1000M.
De-rating for altitudes above 1000M 10% per 1000M A.S.L.
Maximum humidity 85% R.H. at 25°C.

Performance using Fenner Standard Shunt and Permanent Magnet Motors

Maximum speed range
at rated output torque 100 to 2000 rev/min.
De-rating for speeds
below nominal min. Consult Fenner.
Nominal Motor maximum speed 2000 rev/min.
Nominal Motor minimum speed 100 rev/min.

Regulation light load
to full load A.V.F.B.
Regulation light load
to full load T.F.B.
Rating

Better than 2% @ 2000 rev/min.
Better than 0,25% – 20r.p.m. to 2000r.p.m.
Continuous, against constant torque.

Controller is capable of a 100:1 constant torque speed range using tacho feedback mode and a DC tacho. Consult Fenner for further details.

Tacho specification

50V dc at maximum speed (based on
2000r.p.m. motor and 2,5V/100r.p.m.
tacho).

Speed Controller

Speed control potentiometer value 5K ohm.
Speed signal input voltage swing 0 to 10V DC (non-isolated).
Speed signal input impedance 11.5K ohms.

2.0 INSTALLATION

Inspection

Unpack the controller to check that all items have been included. Inspect for loose parts, broken components, dents and any other evidence of rough handling. Check the nameplate to see that model number, input voltage, and power match the order.

Cooling

The controller should be mounted vertically, in a position where there is adequate room for normal air cooling. At least 100mm around the unit should be left clear of all obstructions to allow for adequate ventilation.

Should the controller be mounted on a non-metallic surface, a gap of at least 10mm should be left between the mounting plate and the surface on which the controller is to be mounted.

Ambient/Environment

Chassis models are intended for mounting within a suitable enclosure of customers supply. It is imperative that the maximum temperature within this enclosure does not rise above +40°C under worst case conditions, taking into consideration the energy dissipation of all components within the enclosure. Ambient air must be clean and dry, free from chemical fumes, flammable vapour and any abrasive or conductive materials.

The controller should be mechanically isolated from any vibration.

IMPORTANT

A good installation is one where care has been taken with the siting of the controller, and low signal control wiring. The controller and wiring should be remote from heavy supply cables, and from contactors which may 'splash'.

3.0 WIRING

This equipment must be installed by a competent electrician.

Mains Isolation

The controller is not provided with a mains supply isolator. The supply should, therefore, be fed via a fused isolator fitted with a standard HRC fuse rated to carry at least the line current indicated in the table on page 1.

Cable Sizing

The external mains supply cables and motor armature cables should also be rated to carry the currents indicated in the Ratings table.

Control Wiring

Certain control wires such as the speed reference input wiring must be in screened cable and run in separate trunking or conduit from power supply wiring and motor wiring. The screen must be connected at the controller main earth terminal only. See connection diagrams for details.

4.0 CONTROLS

Potentiometer Functions and Operation

Control	Operation
Speed Control	Clockwise to increase speed
Speed Stability STAB'	Factory set
Current Limit I'LIM'	Anti-clockwise to decrease current limit
I.R. Compensation I.R. COMP'	Factory set
Accel/Decel	Anti-clockwise to reduce accel/decel time
Maximum Speed	Anti-clockwise to decrease maximum speed
Minimum Speed	Clockwise to increase minimum speed

All preset potentiometers are mounted on the control PCB and are clearly marked. The speed control potentiometer will be mounted remote to the controller to the customers own requirements.

5.0 PRE-SWITCH-ON CHECKS

Visually check the controller for broken or loose components and replace any faulty units.

Check that the controller and motor have been wired in strict accordance with the interconnection diagram.

Using low voltage resistance meter check all outgoing terminals on the controller and motor to earth. Repair or replace any suspect connections or wiring.

6.0 SETTING UP

Warning

Equipment inside this controller is at mains potential. Lethal voltages exist on the power circuit; extreme caution must be exercised when making adjustments inside the unit.

Each controller supplied will be factory preset. It should only be necessary to adjust maximum and minimum speeds on the controller; to give a speed range around the nominal. Adjustment may also be necessary to the acceleration/deceleration rate.

Note

The set up procedure should only be followed if doubt exists as to the setting of the pre-set controls.

- 1) Ensure that the pre-switch-on checks have been carried out.
 - 2) Check that link LK2 is correct for the mode of operation. For A.V.F.B. the link is in, for T.F.B. the link is out.
 - Note** The controllers would normally leave the factory set for armature voltage feedback.
 - 3) Check that link LK1 is in position for .37Kw rated motors and out for .18Kw.
 - 4) Ensure that the controller, motor and tachometer (if using T.F.B. mode) are wired in strict accordance with the inter-connection diagram.
 - 5) Set the main speed potentiometer plus min. and max. presets fully anticlockwise.
 - 6) Set potentiometer I'Lim fully clockwise.
 - 7) Switch on the mains supply to the controller.
 - 8) Turn min. preset slowly clockwise until the required minimum speed is obtained.
 - 9) Turn the main speed control pot, slowly clockwise to its maximum position and adjust max. preset until the required maximum speed is obtained.
 - 10) Turn the main speed pot fully anticlockwise to the minimum speed position, switch off the controller and isolator from the main voltage supply. Connect a moving coil dc ammeter in series with the motor armature and with the motor coupled to normal operating load, re-energise the controller and slowly turn the speed control potentiometer until the motor runs at its maximum speed. Allow controller to reach its normal operating temperature.
 - 11) Turn I'Lim preset anticlockwise until the motor speed and armature current just begins to fall, readjust the setting of I'Lim slightly clockwise until the motor runs once more at its maximum speed.
 - 13) Switch off the drive and let the motor come to rest. With the speed control turned to maximum (fully clockwise) restart the drive and note the armature current while the motor is accelerating up to speed. This value should not be greater than that listed as 'Full load motor armature current' in the Ratings table.
 - 14) When the acceleration is complete and the motor reaches its maximum speed, the armature current should be seen to reduce to that normally required to drive the equipment. This value should not be greater than that listed as 'Full load armature current' in the Ratings table.
 - 15) **Setting Accel/Decel** This control operates over the range of approximately 1.5 – 15 secs. Adjust the accel/decel preset to achieve smoothest accel/decel rates which best suit the application (clockwise to lengthen the accel/decel time).
- Note** Additional low speed compensation can be achieved by removing zero ohm link R8, if required, for Shunt wound machines.

INTERCONNECTION DIAGRAM

