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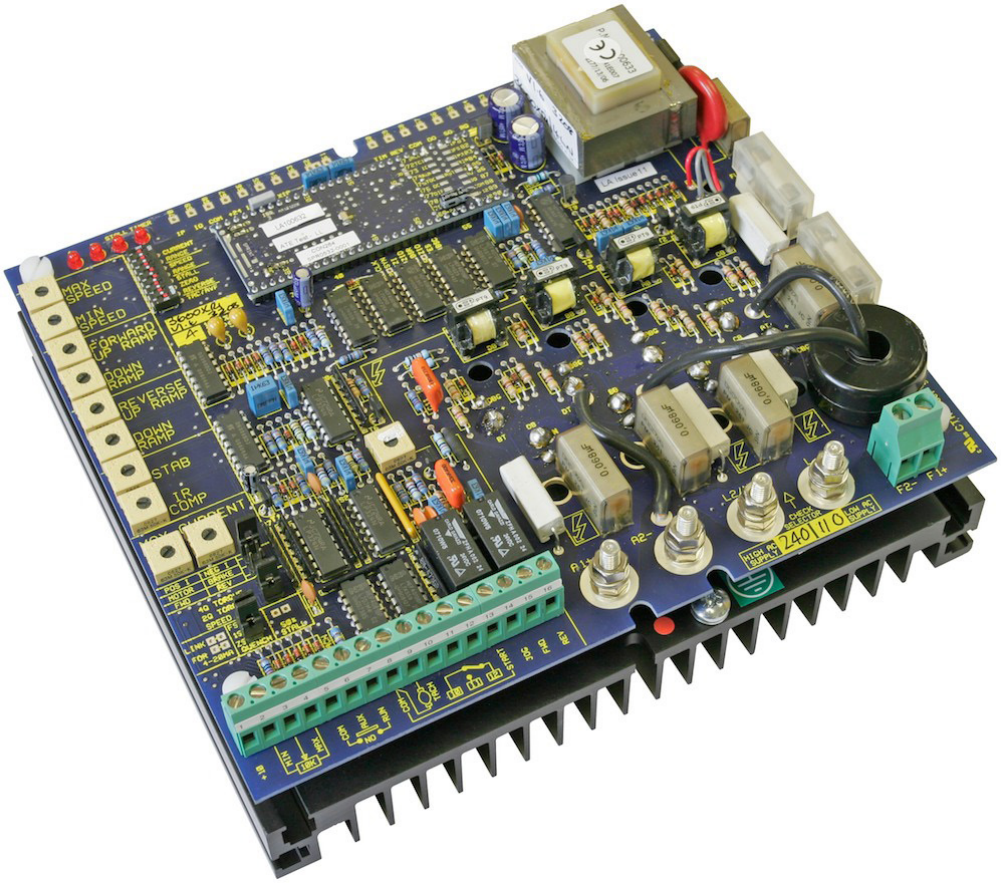
HG105003 ISS1

PRODUCT MANUAL:
3600XRi



SPRINT ELECTRIC

Contents

1 Important safety notes

Drives and process control systems are a very important part of creating better quality and value in products, but they must be designed, installed and used with great care to ensure everyone's safety. Pay particular attention to all the safety warnings in this section.

Electric shock risk! Electrical devices constitute a safety hazard. It is the responsibility of the user to ensure compliance with any acts or bylaws in force.

All personnel who will install, use or maintain this equipment must read and understand this manual before applying power to the device. If in doubt, refer to the supplier.

Only install this device if you have the skills and knowledge to use it safely.

Only use qualified personnel to design, construct, operate and maintain your systems.

Make sure that all personnel who use or maintain the equipment are aware of all the hazards that are involved in your equipment and processes.

If you have any doubts about the safety of your system or process, do not proceed without first consulting an expert.

The ac supply filters must not be used on unbalanced power supplies, or those that float with respect to earth.

The drive and ac filter (if supplied) must only be used with a permanent earth connection. Do not use plugs and sockets in the ac supply.

The ac supply filter (if supplied) contains high-voltage capacitors and should not be touched for 20 seconds after the removal of the ac supply.

This controller is an open-chassis component for use in a suitable enclosure.

2 Models

Sprint Electric offers a range of isolated dc thyristor 4-quadrant drives. In the 3600XRi model range each drive has the same features and terminals. Select the appropriate model depending on the motor current and the available supply voltage.

3600XRi drive type	**ac supply voltage** (Vac)	**Nominal output** (Vdc)	**100% amps dc output** (Adc)
4/LN	240/110	180/90	4
8/LN	240/110	180/90	8
16/LN	240/110	180/90	16
16/LL	415/240	320/180	16
32/LL	415/240	320/180	32
36/LL	415/240	320/180	36

Note: 1. Low volt versions are available, operating on 60/30 Vac supplies giving 48/24 Vdc output and 48/24 Vac supplies giving 38/18 Vdc output.

2. Top terminals can be added on request.

3. All types are of open-chassis construction with rear heatsink.

4. Nominal output is based on a maximum Form Factor (ratio of RMS ac supply current to dc output) of 1.5.

3 Description

The 3600XRi models use closed-loop control of both armature current and voltage to give precise control of the motor torque and speed. The motor and drive are thermally protected by a stall timer that automatically removes power after approximately 30 seconds if the required speed cannot be achieved.

The drives will provide up to 150% of the preset maximum current during this period, allowing high short-term torques during acceleration or shock loading.

Independent control of either the current or speed loops by external inputs allows torque or speed control applications with overspeed or overcurrent protection. The speed demand signal may be derived from a potentiometer, 0-10 V signal, 0 -20 mA or 4-20 mA loop. The current limit can be derived from a potentiometer or 0 – 10 V signal. A bipolar speed demand is only possible with a voltage input.

The speed feedback signal may be selected to be the armature voltage or a shaft mounted tacho.

The drives are chassis components and must be mounted in a suitable enclosure with a fused supply.

The fuses must be semiconductor types according to the recommendation given in the Protection section of the Technical specifications on page 23.

Failure to use the correct semiconductor fuse ratings will invalidate any warranty.

Control of shaft direction can be by linear voltage signals or pushbuttons. Direct connection to PLC logic controllers is also possible.

Braking of the motor can be fast or ramped, and facilities exist which allow choice of action dependent on direction of rotation. Braking energy is returned to the supply.

Speed and current range are selected by on board function switches and independent adjustment presets are provided for:

- Forward up ramp
- Forward down ramp
- Reverse up ramp
- Reverse down ramp.

The positive and negative current limits are also independently adjustable.

Motoring and braking torque can be adjusted independent of the direction of rotation.

There are a number of additional inputs and outputs which are all electrically isolated from the mains supply to allow simple interfacing to external sources.

4 Block diagram

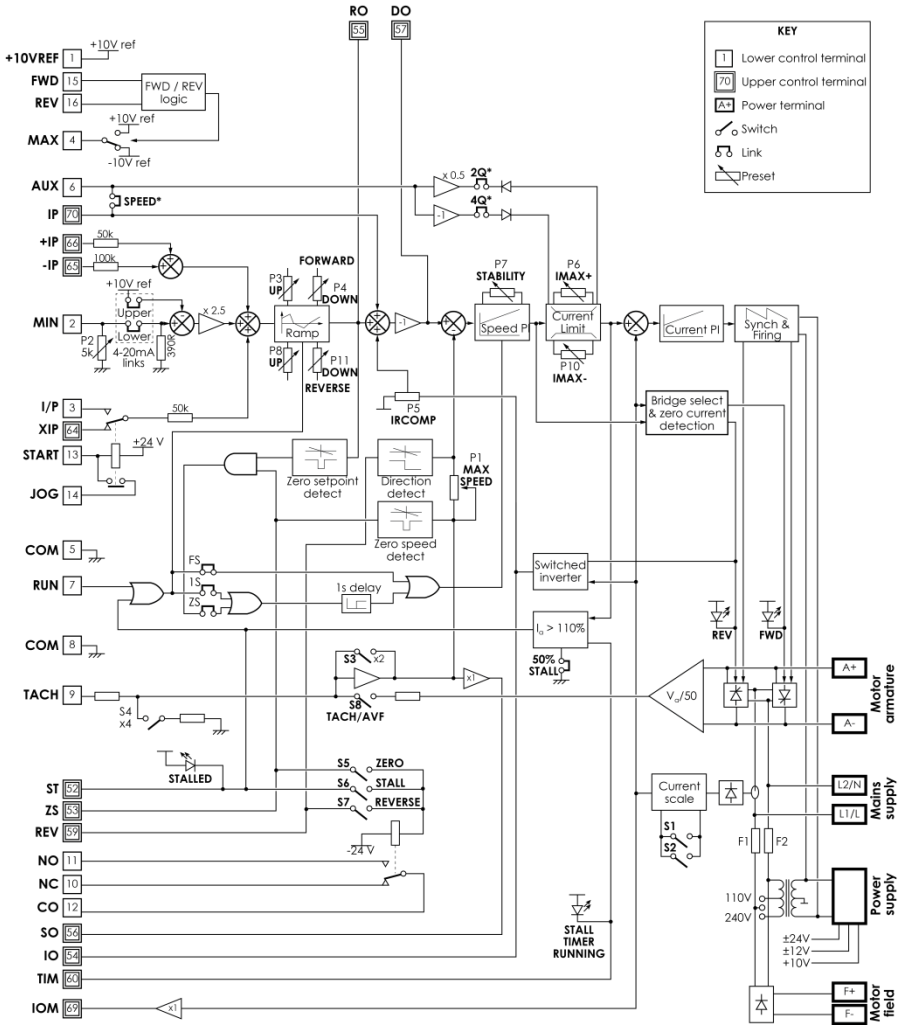


Figure 4-1: Block diagram

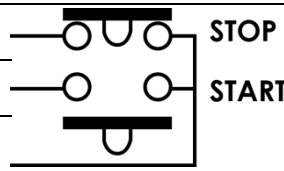
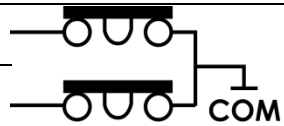
*Note: Only one of the SPEED, 2Q and 4Q links (marked with *) can be fitted at any one time.*

The terminals are described in section 4.1.

4.1 Terminal descriptions

4.1.1 Control terminals

Term.	Description
1 +10	+10 V precision reference. 10 mA maximum. Short-circuit proof.
2 MIN	Minimum (ACW) end of setpoint potentiometer, or 4 - 20 mA / 0 – 20 mA current loop input.
3 I/P	± 10 V input for speed setpoint.
4 MAX	Maximum (CW) end of setpoint potentiometer in bi-directional systems. Set by FWD/REV inputs to +10V or -10V (defaults to -10 V if T15 and T16 are unused)
5 COM	COMMON (4 - 20 mA / 0 – 20 mA return). Internally connected to T8, T58 and T68.
6 AUX	Auxiliary input. Function set by links – see section 6.3.
7 RUN	Connect to COMMON to run. Function set by links – see section 6.3. It is good practice to connect a normally open auxiliary contact of the drive's supply contactor in series with this input. ⚠ RUN is an electronic inhibit function. The field remains energised and all power terminals remain live. Do not rely on RUN to make the system safe during hazardous operations on the machine or control system.
8 COM	COMMON. Internally connected to T5, T58 and T68.
9 TACH	Tacho input 25 – 400 V. Negative for forward rotation.
10 N/C 11 N/O 12 C/O	Relay contact rating 1 A, 125 Vac. Configurable function – see section 7.1.2.

8 COM	N/C STOP pushbutton	8	
13	N/O START pushbutton	13	
14	START latch line	14	
15	N/C FORWARD pushbutton	15	
16	N/C REVERSE pushbutton	16	

4.1.2 Ancillary terminals

51 -24	-24 V relay supply. 25 mA. **NOT SHORT-CIRCUIT PROOF.**
52 ST	Stall relay driver output. Maximum 25 mA. External relay is de-energised when stall timer trips if connected as in Figure 4-2.
53 ZS	Zero speed relay driver output. Maximum 25 mA. External relay is de-energised at zero speed if connected as in Figure 4-2
54 IO	Scaled current output. ±5 V for ±100%. 1 kΩ output impedance.
55 RO	Speed setpoint ramp output. ±10 V for ±100%. 1 kΩ output impedance.
56 SO	Speed output. Full-scale reading determined by max speed preset setting. Variable between ±4 V for ±100% to ±9 V for ±100%. 1 kΩ output impedance.
57 DO	Inverted total speed demand output. +10 V for -100%; -10 V for +100%. 1 kΩ output impedance.
58 COM	COMMON. Internally connected to T5, T8 and T68.
59 REV	Relay driver. Maximum 25 mA. External relay is de-energised when the speed reverses or at zero speed if connected as in Figure 4-2.
60 TIM	Relay driver. Maximum 25 mA. External relay is de-energised when the stall timer is operating (current demand > 105%) if connected as in Figure 4-2.
61 +12	+12 V output. 10 mA maximum.
62 SS	Stop/Start input. Close to -12 V to force a stall condition. Close to +12 V to release stall condition.
63 -12	-12 V output. 10 mA maximum.
64 XIP	Input to speed setpoint ramp circuit when relay RL2 is de-energised (T3 is disconnected). ±10 V for ±100%.
65 –IP	Auxiliary inverting speed input. 0V to -10 V for 0V to +100% speed; 0V to +10 V for 0 to -100% speed.
66 +IP	Auxiliary non-inverting speed input. ±10 V for ±100%.
67 +24	+24 V output. 25 mA maximum. **NOT SHORT-CIRCUIT PROOF.**
68 COM	Drive Common. Internally connected to T5, T8 and T58.

69 IOM	Metering output, 0 to 5 Vdc representing 0 to 100% scaled armature current. See SW1 and SW2. Internally connected to T6.
70 IP	Auxiliary input to speed demand scaled ±10 V for ±100% (if the Torque/Speed link is in the SPEED position).

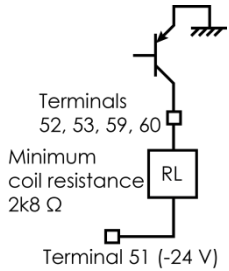


Figure 4-2: Relay circuits

4.1.3 Power terminals

A1 +	Motor armature connection (positive).
A2 -	Motor armature connection (negative).
L2/N	Line ac return; either neutral or L2.
L	Line ac supply input.
F2-	Motor field connection (negative).
F1+	Motor field connection (positive).

5 Installation

Make sure the ac power supply is disconnected before working on the unit.

The unit has two centre fixing slots for mounting.

Mount the unit to allow at least 50 mm clear above and below the unit to allow cooling air to circulate over the heatsink fins.

Make sure the heatsink is earthed with the M5 screw provided at the front edge. The earth connection should have a cross sectional area of at least 6 mm^2.