

R353/S353

Modular Electronic Sequencer

Description

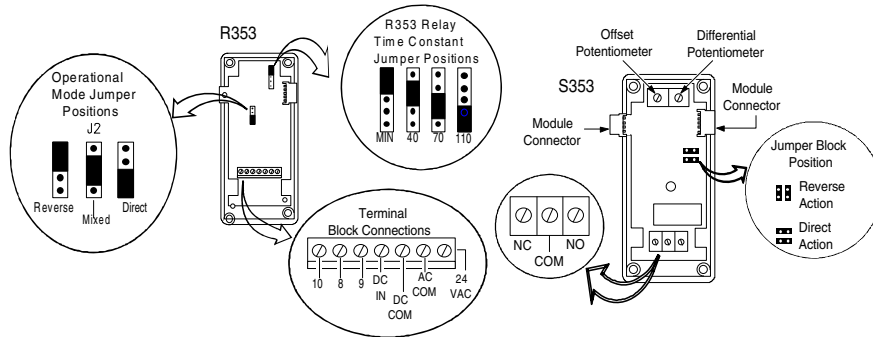
The System 350™ R353/S353 Modular Electronic Sequencer is designed to provide multi-stage control in HVAC and refrigeration applications. The R353 Signal Input Module accepts input signals of 0 to 10 VDC, 0 to 20 mA, or 135 to 10k ohm slidewire potentiometer to drive up to ten S353 modules. The S353 Stage Modules contain a SPDT relay with an LED indicator of relay status. The sequencer's modular design provides easy, plug-together connections for quick installation and future expandability. The R353/S353 may be used as a replacement for the Penn R23 Actrol™ Sequencer.

Features

- electronic accuracy and repeatability
- field selectable direct, reverse-acting, or mixing applications
- field selectable time delay
- up to ten S353 stage modules
- wall or DIN rail mounting
- plug-together connection



R353 and S353



Interiors of R353 and S353

Applications

- electronic forced air systems
- electric boiler heating element staging
- boiler staging
- refrigeration and air conditioning capacity control
- multi-stage combination heating and cooling systems
- heat pumps
- multi-stage fan systems for farm and industry
- heat recovery systems

Selection Chart

Code Number	Description
R353AA-1C	Electronic Sequencer Signal Input Module
S353AA-1C	Electronic Sequencer Stage Module

Modular Electronic Sequencer (Continued)

Technical Specifications

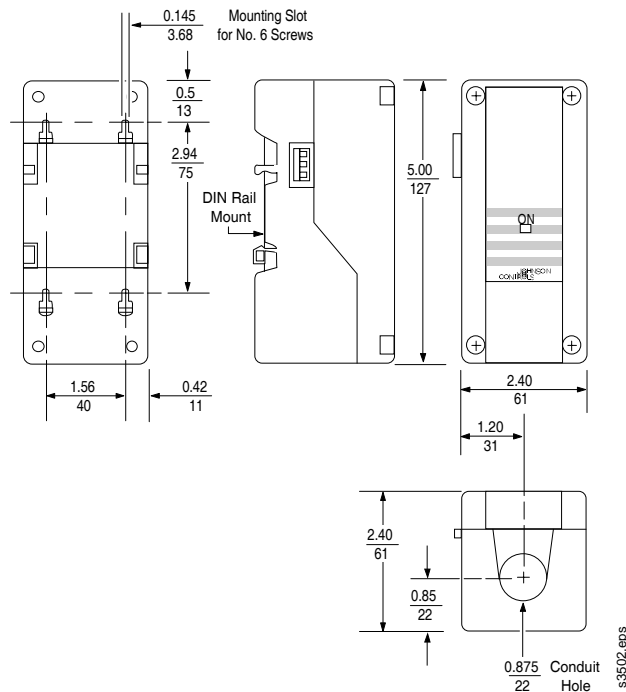
R353/S353 Modular Electronic Sequencer		
Case and Cover Material	NEMA 1, high-impact thermoplastic	
Supply Voltage ¹	Transformer	20 to 30 VAC, 50/60 Hz, Class 2
	Y350R	Input Voltage: 120/240 VAC, 50/60 HZ Output Power: 24 VDC unfiltered, 10 VA maximum
Power Consumption	R353	1 VA maximum
	S353	1.25 VA maximum
Input Impedance	27K ohms (voltage mode with Resistor R27 clipped); 500 ohms (milliamp mode with Resistor R27 left in place) ²	
Ambient Temp. (Both Modules)	Operating	-30 to 150°F (-34 to 66°C)
	Shipping	-40 to 185°F (-40 to 85°C)
Humidity	Both Modules	0 to 95% RH non-condensing, 85°F maximum dew point
Time Delay	<1, 40, 70, 110 second time constant	
Relay	S353AA	SPDT enclosed relay. Contacts rated at 10 amp non-inductive, 1/2 hp 120/240 VAC.
Differential	S353AA	1 to 7% of the maximum input signal
Offset Range	S353AA	0 to 75% of the maximum input signal

1. Only one voltage source may be used.

2. If resistor R27 is not clipped, a voltage controller will still be able to drive the sequencer, but the current requirement will be 20 mA at 10 VDC.

Relay Contact Ratings (S353)

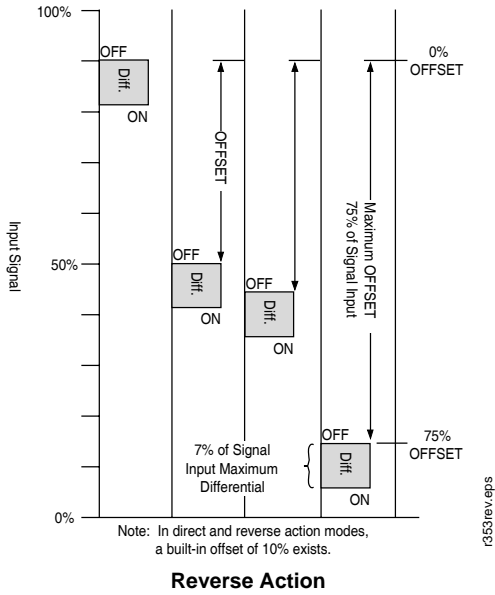
Voltage, AC Only	120	208/240
Full Load Amp	9.8	4.9
Locked Rotor Amp	58.8	29.4
10 Amps Non-Inductive at 24/240 VAC		
Pilot Duty 125 VA at 24/240 VAC		



R353/S353 Dimensions, in. (mm)

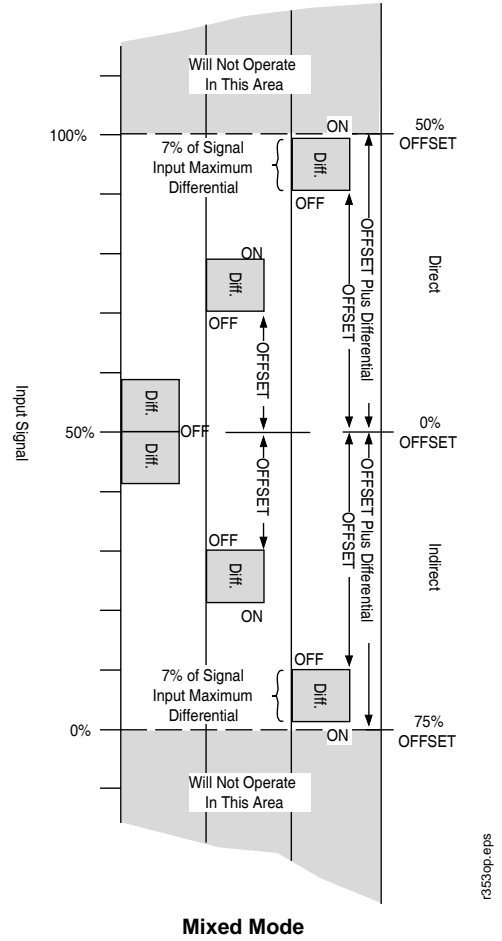
Modular Electronic Sequencer (Continued)

Control Signal Options for R353 Module



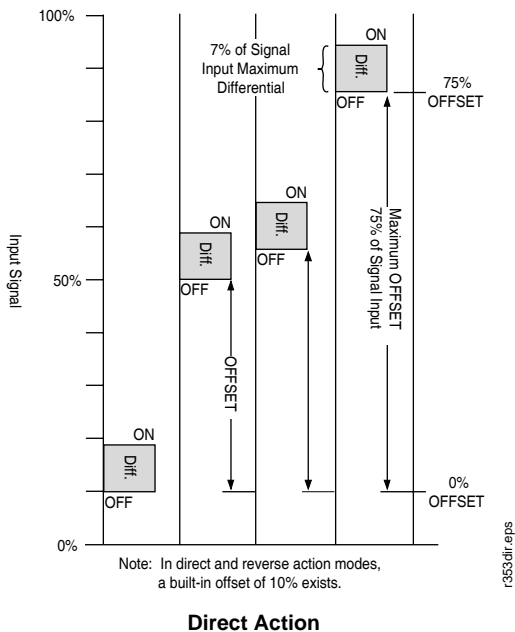
Sequence of Operation for R353 Set for Reverse Action (4 Stage)

This mode of operation is set by positioning the jumper block at the top of the circuit board. Offset can be adjusted from 0 to 75% of the R353 input range and differential adjusted from 1 to 7% of R353 input range. The S353 will energize the electrical loads as the input signal decreases.



Sequence of Operation for R353 Set for Mixed Mode (2 Stage Direct - 2 Stage Reverse)

This mode of operation is set by positioning the jumper block in the center of the circuit board. Offset can be adjusted from 0 to 75% of the R353 input range and differential adjusted from 1 to 7% of R353 input range. At 50% input signal, offset can be positioned at 0%. On an increase from this point, stages will energize while the same applies for a decrease in input signal.

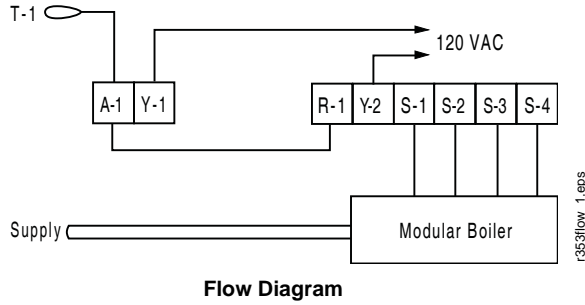


Sequence of Operation for R353 Set for Direct Action (4 Stage)

This mode of operation is set by positioning the jumper block at the bottom of the circuit board. Offset can be adjusted from 0 to 75% of the R353 input range and differential adjusted from 1 to 7% of R353 input range. The S353 will energize the electrical loads as the input signal increases.

Modular Electronic Sequencer (Continued)

R353/S353 Sequencing of Boiler, Based on Room Temperature



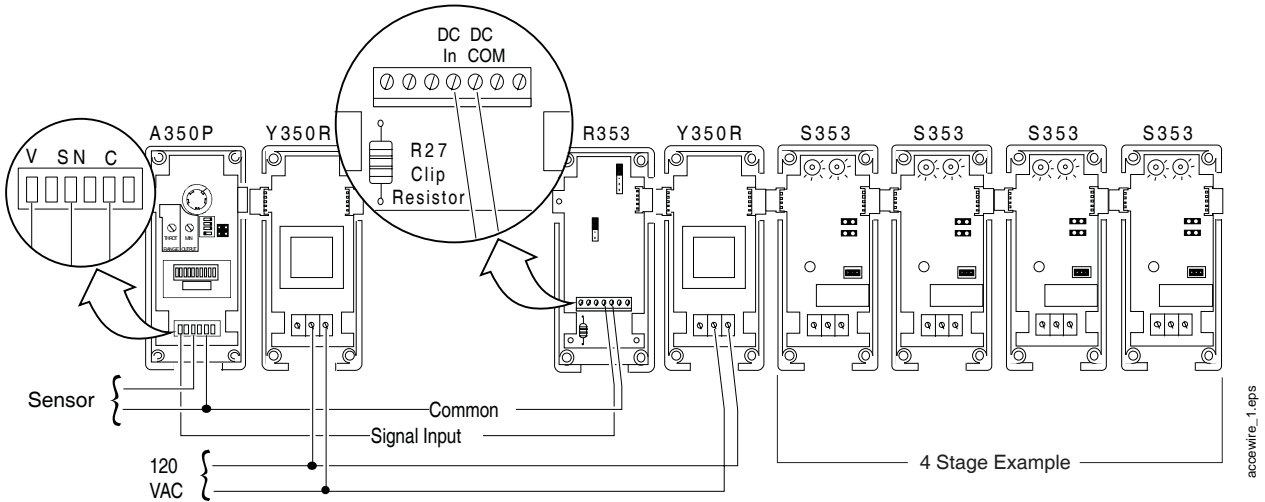
Flow Diagram

Sequence of Operation

Control A-1 powered by Y-1, maintains a room setpoint of 70°F in the winter via a modular boiler hot water system. On a drop in room temperature, sensor T-1 decreases its resistance signal to A-1. Control A-1 is set for reverse action, sending an increased output signal to control R-1, powered by Y-2. R-1 energizes the staging of the modular boiler via stage modules S-1 through S-4 until the setpoint on control A-1 is satisfied. On a rise in room temperature, control A-1 decreases its signal to R-1 de-energizing stage modules S-1 through S-4.

Bill of Materials

ID	Qty	Code Number	Description
A-1	1	A350PS-1C	Proportional Temperature Control
R-1	1	R353AA-1C	Electronic Sequencer Input Module
S-1	1	S353AA-1C	Stage Module
S-2	1	S353AA-1C	Stage Module
S-3	1	S353AA-1C	Stage Module
S-4	1	S353AA-1C	Stage Module
Y-1	1	Y350R-1C	Power Module
Y-2	1	Y350R-1C	Power Module



Wiring Diagram (Using the A350P's 0 to 10 VDC Output)