



A1093 AMPLIFIER
TD92 TEMPERATURE DIAL
TS194Q SENSOR WITH MIXING TUBE
MODULATING GAS VALVE

Series

3

11/04 MS2099

MODULATION

FOR USE WITH 2-STAGE BURNER SYSTEMS

ORDAN

MAXITROL  company

Easily turn a 2-stage indirect fired furnace into a modulating furnace with Maxitrol's Series 3 electronic gas modulation system. You'll be glad you did. Improved performance, a comfortable work environment, and precise control of discharge air temperature are just a few of the advantages the Series 3 system has over a conventional system.

Maxitrol Company originally designed the Series 3 system for use with duct furnaces - additional applications include indirect makeup air heaters and commercial furnaces. Heaters using atmospheric indirect fired gas burners are typically used in both large and small industrial and commercial buildings. Any of these heaters with a 2-stage gas valve and a 2-speed combustion blower is a candidate for a Series 3 upgrade.

Many of the benefits of upgrading to the Series 3 modulation system are a direct result of the system's ability to obtain a higher turn down on atmospheric indirect-fired applications.

Such furnaces typically have a turn down that is 50% of the high fire input. Converting to Maxitrol's Series 3 system can reduce the turn down to 25%, or lower, of the high fire input. By controlling the switch point of a relay connected to the gas valve and inducer we are able to create two separate modulation ranges.

A higher turn down allows you to accurately control the discharge air temperature and significantly reduces the cycling of the heater, resulting in a consistent room temperature. This is especially true when you're using multiple units with a large duct system (see example).

We also eliminate problems associated with lighting the burner at the lowest gas input by providing an adjustable timer and adjustable VDC output to the modulating valve on start-up.

The Series 3 system is used with Maxitrol's industry leading Selectra modulator and modulator-regulator (M/MR) valves. These unique electronic valves provide quick reaction times & offer continuous burner pressure adjustment.

SYSTEM REQUIREMENTS

- Two-stage gas combination control. Low stage (flow) set approx. 50% of High stage (flow).
- Two-speed combustion blower (inducer).

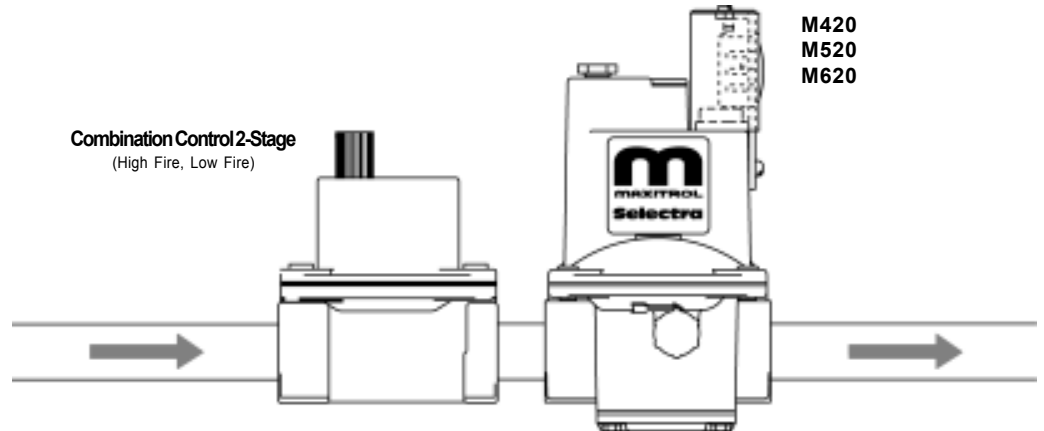
PRODUCT SPECIFICATIONS

Power Requirements	24 VAC, 50/60 Hz Class II transformer
Ambient Limits	-40°F (-40°C) to 158°F (70°C)
A1093 Dimensions	7.5" x 3.4" x 1.9"
TD92 Dimensions	4.0" x 4.0" x 2.8"
Valves	M420, M520, M620 Series (one required)
Sensor	TS194Q with mixing tube
Discharge Air Temperature Range	TD92-0509: 50°F (10°C) to 90°F (32.2°C) (Other temperature control ranges configured upon request.)
Combustion Blower and Gas Valve Relay	Normally Open 20 AMP maximum at 25°C
Burner Light Off Adjustment	Adjustable timer (0-30 sec) & adjustable VDC (5-15 VDC) output to the modulating gas valve on startup.* <small>* Starts when power is supplied to amplifier.</small>

TYPICAL MANIFOLD PRESSURES

Position	Inlet Pressure (in. w.c.)	Outlet Combination Control (in. w.c.)	Outlet Modulator (in. w.c.)	% of Max Input
High stage 2	7"	3.6"	3.5"	100
Low stage 2	7"	3.6"	0.7"	45
High stage 1	7"	1.0"	1.0"	55
Low stage 1	7"	1.0"	0.2"	25

TWO-STAGE MODULATING INDIRECT FURNACE



EXAMPLE TYPICAL APPLICATION REQUIRING 16:1 TURNDOWN

Multiple Units

- ↓ Large single duct system
- ↓ 4 duct furnaces each with a rated input of 400,000 BTUH
- ↓ 4 units total 1.6M BTUH
- ↓ One unit is modulated by Series 3 resulting in a 4:1 Turn Down - 100,000 BTUH to 400,000 BTUH
- ↓ The other units are staged ON/OFF using customer supplied staging control

Total turn down: 16:1

FOR USE WITH ENERGY/BUILDING MANAGEMENT SYSTEMS

The Series 3 discharge air temperature can be set using a current loop output from an **energy/building management system**. No modification to the A1093 is required. However, the following must be observed:

The input current range should be limited from 5.0mA to 13.0mA. This range corresponds to a set point temperature range of 50°F to 130°F (i.e. 0.1mA/°F). (The input current range for the A1093 is not a standard 4-20mA interface.)

SUPPLIED WITH SERIES 3

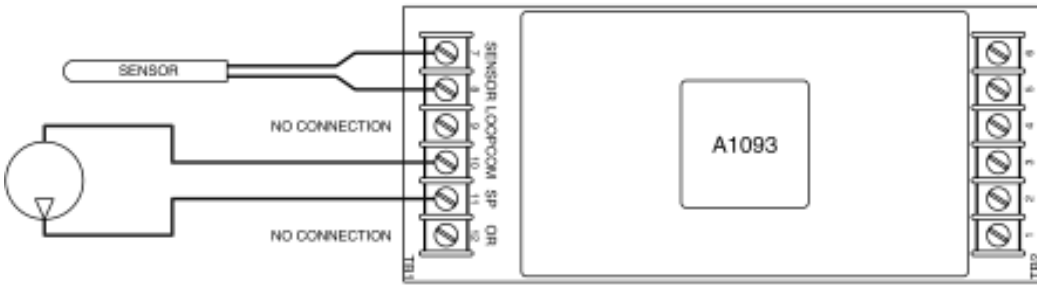
- A1093 Amplifier
- TD92 Temperature Dial
- TS194Q with mixing tube
- Modulating Gas Valve

TYPICALLY SUPPLIED WITH FURNACE

(See Typical Wiring Diagram)

- 2-stage Combination Gas Valve
- 2-speed Inducer
- 2 SPDT Relays
- 1 SPST Relay
 - ↳ Powers A1093 with separate transformer when 24 VAC is supplied to combination gas valve.
- 1 N.O. SPST Timer Relay (optional)
 - ↳ Gives time for inducer to reach High speed position.
- 24 VAC 20 VA Transformer (separate, recommended)

A1093 WITH EXTERNAL CURRENT LOOP



CURRENT LOOP INPUT

5.0 mA = 50°F
 13.0 mA = 130°F
 Rin = 100 ohms
 (nominal)

Note:

Connect externally powered current loop to TB1, terminals 10 and 11 as shown. No external connection is required to "LOOP" (TB1, terminal 9) or (TB1, terminal 12). Connections to TB2 are not shown.

TYPICAL WIRING DIAGRAM

