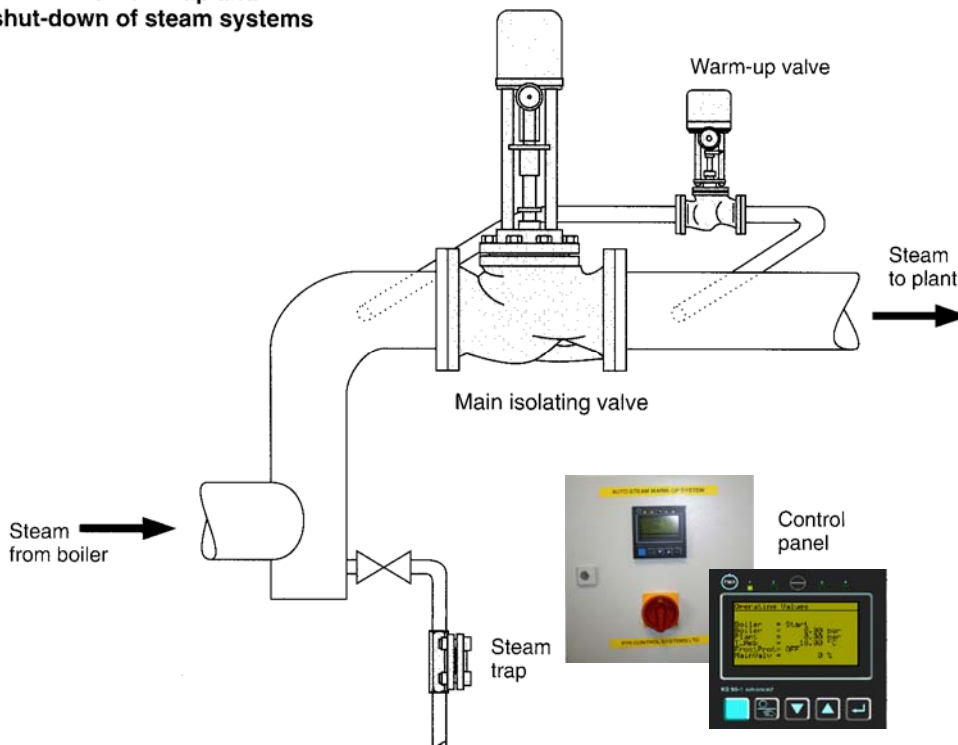


# STEAM WARM UP SYSTEMS

## Automatic warm-up and shut-down of steam systems



### The valves

Cast steel valves with stainless steel valve cone and seat are used and are suitable for steam pressures up to 32 bar (465 psi). The electric actuators have a high closing force for tight shut-off and may use single phase or three phase supplies depending on the valve size. All actuators incorporate a handwheel for manual operation of the valve. The warm-up valve is typically size 25mm (1"), the main isolating valve is normally the same size as the pipeline.

### Single valve systems

Where the extra cost of the two valve system cannot be justified, the main valve can also be used for warming up. An additional limit switch is fitted in the actuator to provide an adjustable warm-up position.

### The control panel

Steel enclosure incorporating the panel-mounting 7 day timer, the warm-up timer (adjustable up to 1 hour), main terminal block and three position switch (auto, manual start, manual stop). For three phase control valves a door isolator and three phase reversing relays are also included.

### The operation of the system is as follows:

1. At the programmed 'on' time the warm-up valve fully opens.

- Warming through follows a pre-programmed sequence to prevent waterhammer
- Adjustable warm-up time before the main isolating valve opens. Main valve closes before warm-up valve to prevent seat damage.
- Seven day digital timer for setting the 'on' and 'off' times each day. Different times may be set each day, or the system may remain 'off' at weekends for example
- Manual override of programmed times.
- The use of separate warming and main isolating valves prevents 'wire drawing' and valve seat damage
- Saves energy by allowing whole steam systems or sections to be shut down automatically

# STEAM WARM UP SYSTEMS

2. At the end of the warm-up time (adjustable up to 1 hour) the main isolating valve fully opens to provide steam to the plant.

3. At the programmed 'off' time the main valve closes, followed immediately by the warm-up valve.

## Using warm-up valves

Every boiler plant is different. Some of the ideas in this data sheet may apply to your plant or you may have other requirements. Tell us what you need and we will design a system for you. The 'Standard' system is described on the front page.

### 1. Frost protection

A frost thermostat can be arranged to override the 7 day timer so that the steam system is automatically warmed through to prevent frost damage.

### 2. Control from the boiler

The control panel can be supplied without the 7 day timer and arranged so that the warm-up sequence will start either when a certain boiler pressure is reached or a fixed time after the boiler is fired. Shut down can also depend on boiler pressure or simply on time.

### 3. Control from the building energy management system

Gestra valves are ideal for control from the building energy management system.

Any warm-up, shut-down or zone control arrangement is easily achieved. Relay outputs or analogue signals can be used to position the valves.

### 4. Warm-up to a set pressure

For process steam systems where the main steam users are isolated when the plant is shut down, the warm-up valve can be used to bring the system up to a certain pressure before the main valve is opened.

### 5. Multi-zone control

Control panels can be supplied to operate two or more warm-up systems for zone control.

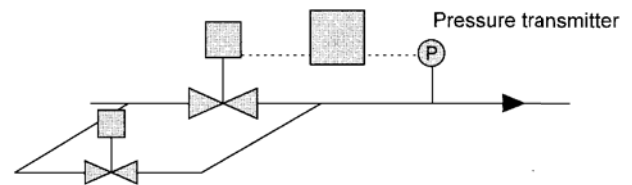
### 6. Combine warm-up and pressure reducing system

Where reduced steam pressure is required an economical solution is to use the same valves for both warm-up and pressure control.

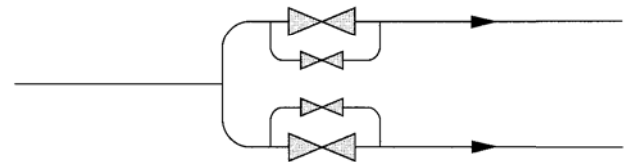
### 7. Combined warm-up and pressure maintaining system

In some plants where there are heavy steam demands it may be necessary to restrict the steam flowrate to protect the boiler. A pressure maintaining valve can prevent excessive steam demand causing the boiler pressure to drop too far. A pneumatic control valve may be necessary to give the fast response required.

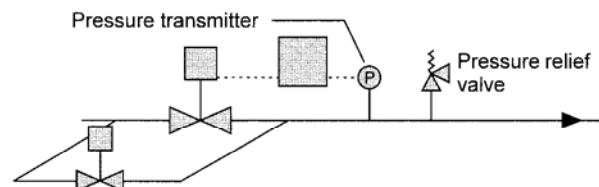
#### 4. Warm-up to set pressure



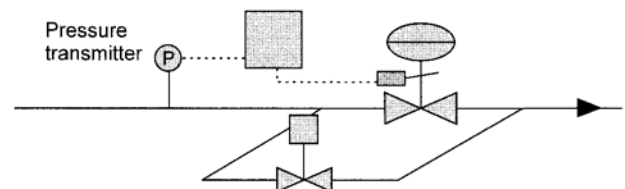
#### 5. Multi-zone control



#### 6. Combine warm-up and pressure reducing system

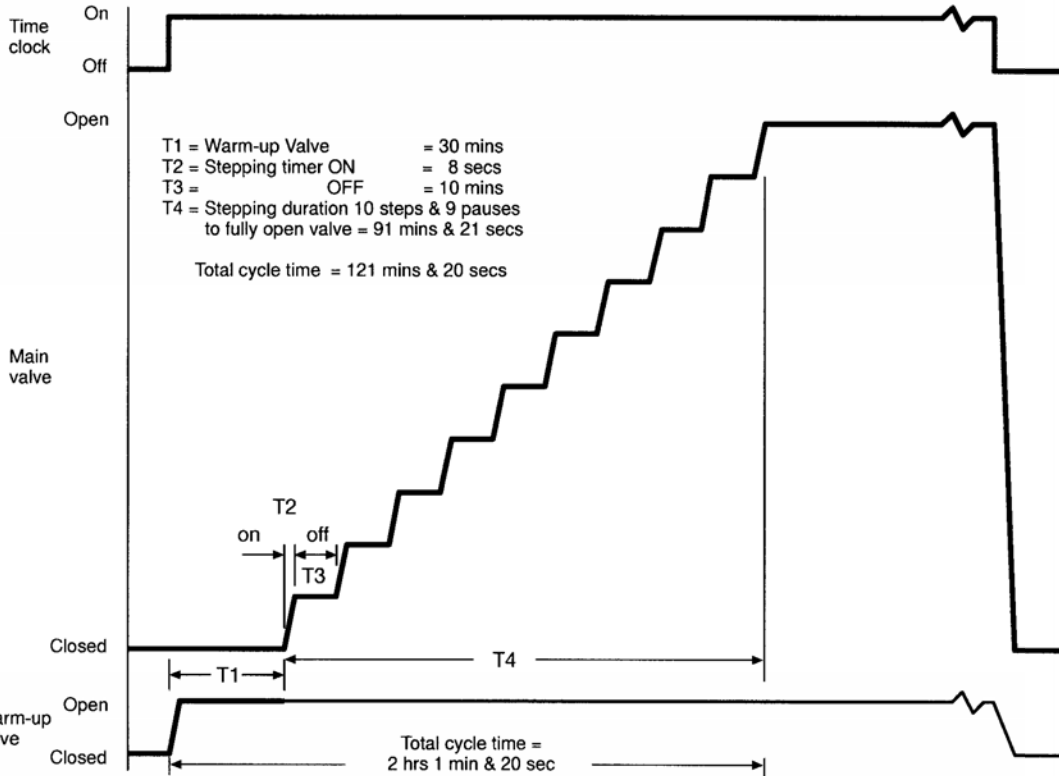


#### 7. Combined warm-up and pressure maintaining system



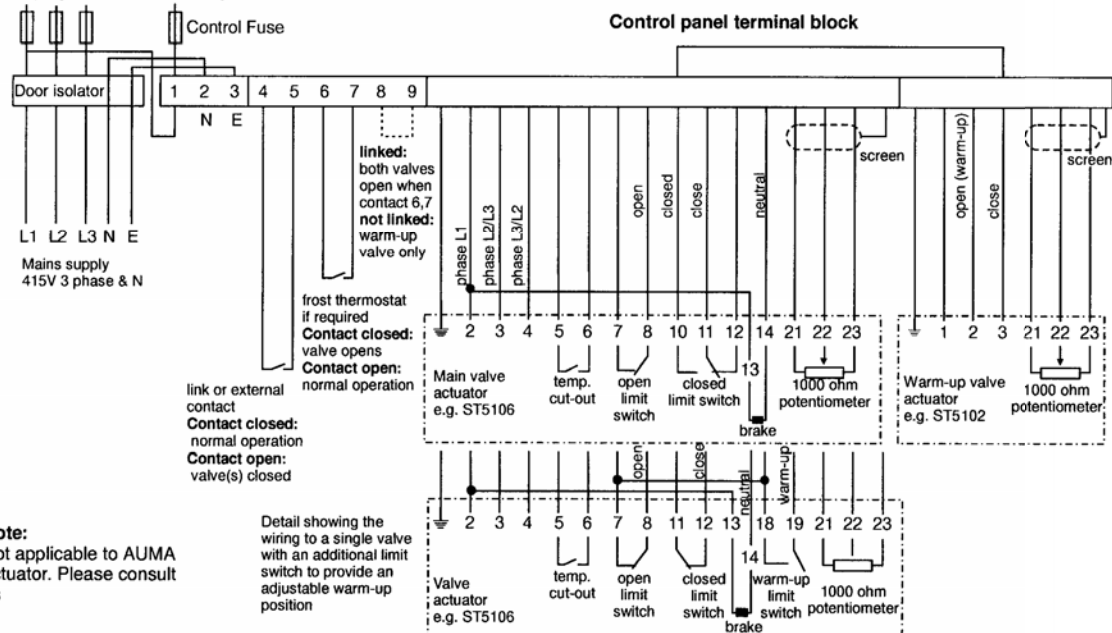
# STEAM WARM UP SYSTEMS

## Example Shown as Ramp Graph



## Typical Wiring Diagram

### Warm-up systems with three phase main valve actuator



**Note:**  
Not applicable to AUMA actuator. Please consult us

Press key 'R' to find and test the 2nd program. There should be no entries here.

Repeat until the complete program is checked and 'END' is displayed.

### Summer/Winter Time Facility

This feature allows you to follow the Summer/Winter seasonal hour change, this can be done up

to one week before the actual time change.

- Set mode switch to 'Time'.
- Press '8' for Summer to Winter.
- Press '9' for Winter to Summer.
- Return to 'Auto' mode. (see appropriate symbol displayed).

The time change will be implemented on the following Sunday Day 7. (If Monday has been set as Day 1). The

Summer/Winter symbol will then disappear from the display.

### Internal Links

Terminals 4-5 are used to connect a second 'Set back' pressure thermostat. If no stat is to be used, these are to be linked out. Before Warm-up can take place, the boiler has to be up to the pressure set on the set-back stat.

### Internal Timers

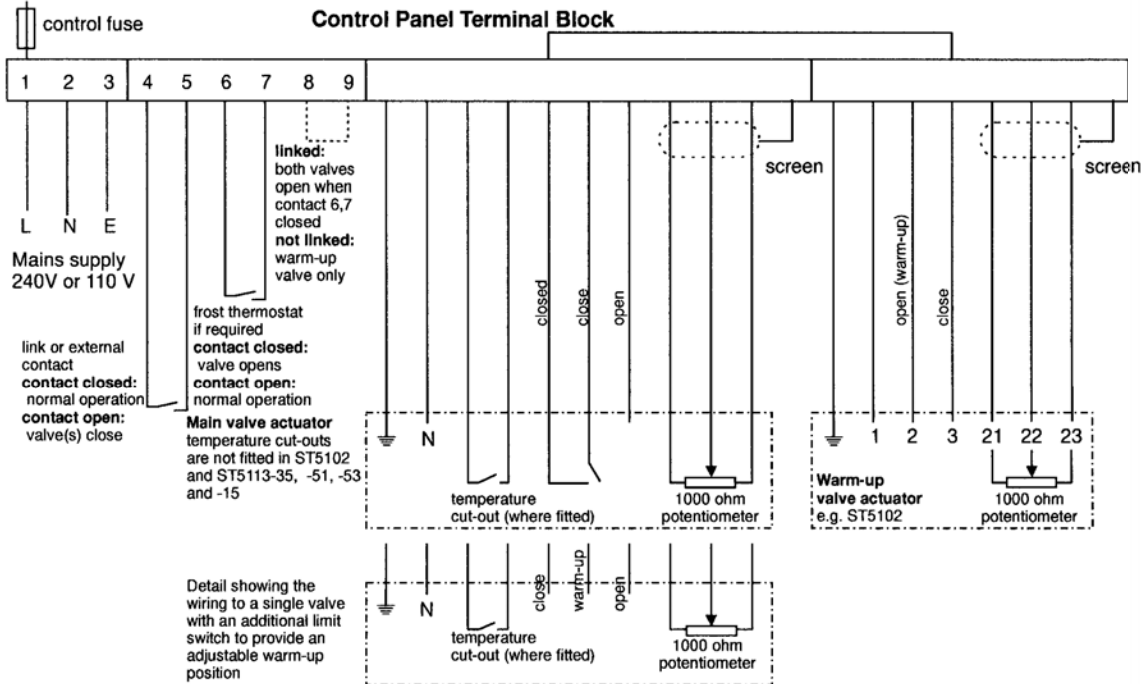
#### Warm-up timer TD1 (M2A or TRA)

At start-up, the warm-up valve is fully opened. Timer TD1 will be set for a pre-determined period, usually of about 30 minutes (adjustable). This means that 30 minutes after the warm-up valve has opened, the opening cycle of the main valve will start. After the 30 minutes has elapsed

# STEAM WARM UP SYSTEMS

## Typical wiring Diagram

### Warm-up systems with single phase actuators



M2L/TD2 (the stepping timer) is energised.

#### Stepping Timer TD2 (M2L or TRL)

This timer will operate on a cyclical basis, e.g. the valve will motor open for a pre-set number of seconds then pause for a pre-set number of minutes. It will continue to do this until the valve is fully open.

#### Setting the TD2

Switch TD2 has two timers on it, there is also a bank of small dip switches for 'on' and a second bank of switches for 'off' and two control knobs on the switch. You

will also see a table of what those various switch positions will give you in the way of time periods e.g. minutes, seconds, hours. It also has a multiplicand factor that has to be taken into consideration. On the front of the switch a small diagram is visible showing the possible switch combinations. On the side of the switch you will see **min x 4** or **min x 10** (in a certain configuration the total elapsed time might be 60 min). In our example we only require a waiting time of, say, 10 min (adjustable) between travel time.

Turn the blue vernier knob around to 10 min or 1/6th of the scale to set the ten minute interval between valve moments. Now move to the second timer on the switch to set the opening step of, say, 8 seconds (adjustable).

#### Total cycle Timer TD3 (M2H or TRH)

Timer TD3 sets the total cycle time, which in this case is 2 hours 1 minute and 20 seconds.

This timer stops the stepping timer M2L/TD2 from further steps.

The valves will now stay open until the main clock stops the operation. The valves will then automatically run down to their closed position.

The main valve will shut down first, as it closes it will power the smaller valve to close.

#### Auto/Manual Override

The panel incorporates an Auto/Manual override switch. Use the 'Open' and 'Close' button to make sure that the valve is travelling in the right direction.

#### Valve Position Indicator

If both valves have feedback pots fitted, the valve position meter will read 'Half Scale' when the warm-up valve is open.

#### Frost Stat Link

The frost stat link is an optional link. With a frost stat installed you get one valve 'open' with the link 'in', and both valves 'open' with the link 'out'.

#### Switching from High Pressure Stat to 'Set Back' Stat

On the valve position switch in the main panel terminals 30-31-32 is an auxiliary switch that switches between the normal and standby stats. When its in stand-by at the end of the duty it has switched from the high pressure stat to the low pressure stat after the valves have closed.

The boiler will now settle to a lower banked pressure before the cycle starts up again.