

Series 170 Lubrication System: Controller Manual

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System General Operation:

Inlet air supply flows through a 5 micron filter and is controlled by two integrated solenoid valves. One valve (injector valve) is used to supply air pressure to a positive displacement injector, while the remaining air valve (nozzle valve) feeds a regulator, which in turn provides air to the downstream nozzle assembly. The positive displacement injector has a known volume and when pressurized (“fired”), lubricant is dispensed out of the metering chamber, through the injector check valve and into the downstream nozzle oil line. Each style of nozzle has an integral check valve which maintains pressure within the oil line between the system and the nozzle assembly.

Internal porting within the nozzle assembly allows the regulated air supply to mix with the oil supply in a precision mixing chamber downstream of the nozzle check valve. It is at this point the air acts as a transport media, shearing the oil into large droplet formations and “carries” the oil from the nozzle outlet to the object to be lubricated. The injector valve is cycled “on/off” with a minimum “on” time of 0.5 seconds. When the injectors are cycled at a fast rate a thick film of oil is produced on the inner walls of the mixing cavity and nozzle tip. When air is introduced the oil migrates along the inner walls and the result is a thick continuous pattern of oil. When the injectors are cycled at a slow rate the film thickness is reduced resulting in a thinner pattern of oil.

The Series 170 lubrication system was designed to function according to two different lubrication applications: “Continuous” or “Pulsed”.

Continuous Application

This is the most common application where the application of lubricant is applied in a “continuous” fashion. The above mentioned nozzle valve is supplying a constant flow of air to the nozzles while the injectors are cycled at the desired rate, resulting in a continuous pattern of lubricant. Nozzle types used for these applications are of the Swivel style, where the check valve assembly is located within the body of the nozzle assembly (creating a larger mixing chamber).

Pulsed Application

This application is predominantly used for assembly processes (i.e. engine assembly), but can also be used for lubricating slow moving chains or overhead trolley wheels. For this application the nozzle air valve is cycled at the same rate as the injector valve, where the “off” time would coincide with the speed of the assembly line or conveyor. This type of application utilizes a “Tube-Type” nozzle assembly, where the check valve is located at the end of the nozzle tip, resulting in a smaller mixing cavity to immediately transfer the dispensed lubricant to the object.

Lubrication Systems

The Series 170 Lubrication system is available with three basic control configurations:

- Customer Controlled
- Timer Controlled
- Relay Controlled

(All of the above are available with three voltage options: 220 VAC, 120 VAC and 24 VDC.)

Definitions:

Dwell Time: Duration that the injector valve is activated.

Off Time: Duration that the injector valve is deactivated.

Injector Cycle Time: Duration of complete cycle (i.e. Cycle Time = Dwell Time + Off Time)

Customer Controlled

This configuration allows the customer to have complete control of the lubrication system. In this scenario the customer is responsible for the following:

- 1). Constant power supply for level and pressure switch fault indicator.
(Reference system prints for power requirements.)
- 2). Injector air valve timing signal. Signal should be cycled "On/Off" according to the timing diagram shown in Fig. 1. (Note: Dwell time should be set for a minimum time of 0.5 seconds.)
- 3). Nozzle air valve signal.
(Dependent upon application, reference Fig. 1).

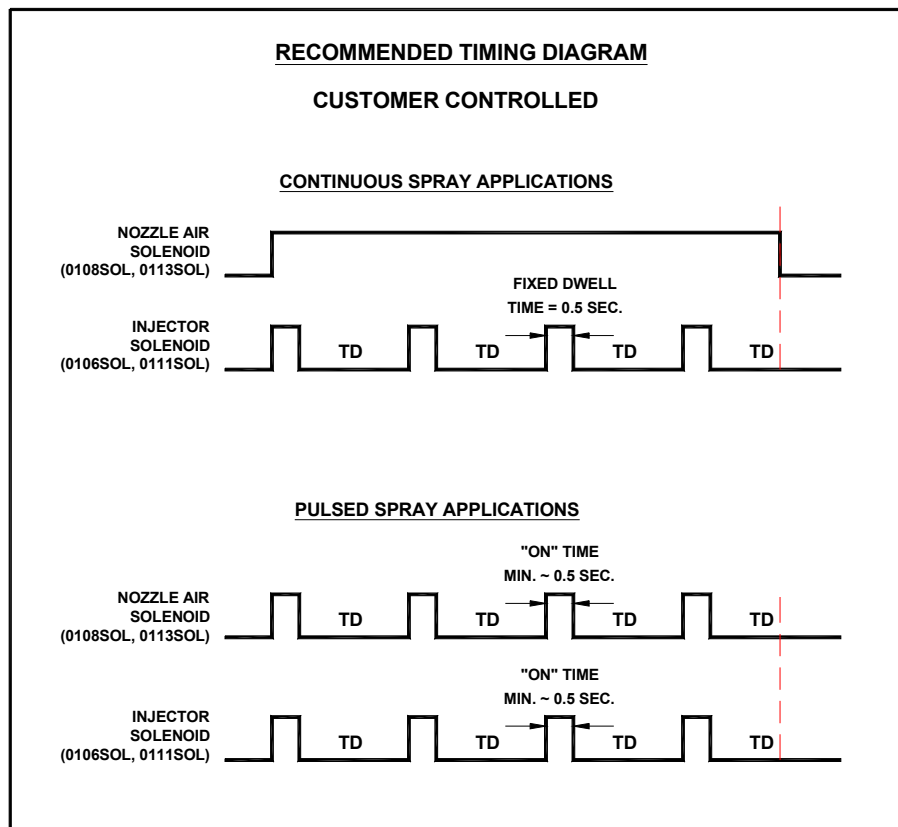
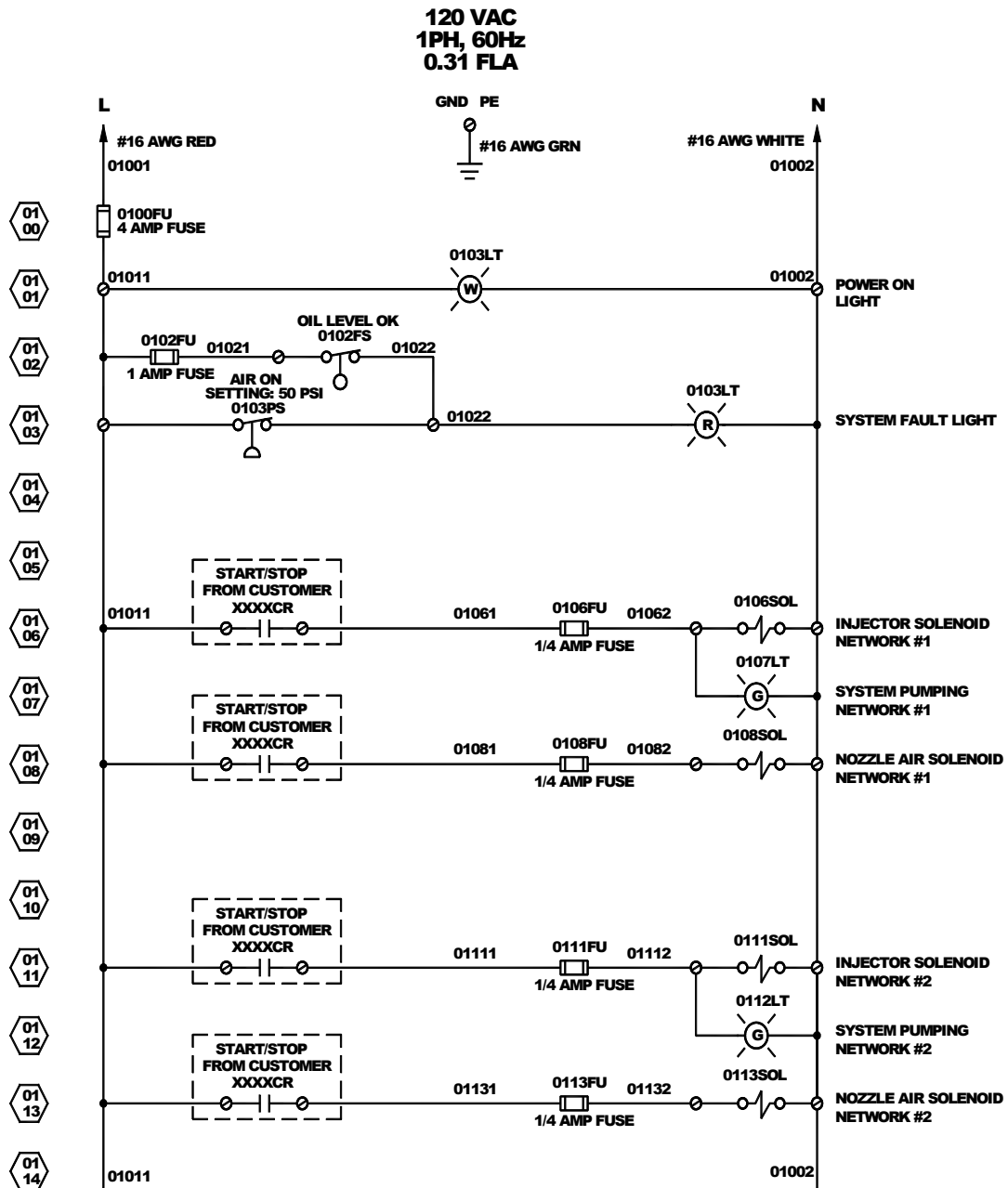


Fig. 1: Customer Controlled Recommended Timing Diagram

Sample Customer Controlled Electrical Diagram
120 VAC, Dual Network System



Timer Controlled

The “Timer Controlled” system allows the customer to control the “On/Off” cycle time of the lubrication system via a PLC or other controller. This type of system has an internal Injector Cycle (IC) Timing Module to control the injector air valve cycle and the nozzle air valve is internally wired according to the application. The customer is responsible for the following:

- 1). Constant power supply for level and pressure switch fault indicator. (Reference system prints for power requirements.)
- 2). Supply of Start and Stop signals for lubrication cycle.
- 3). Internally set IC Timer for desired injector “off” time, thereby setting injector cycle time.

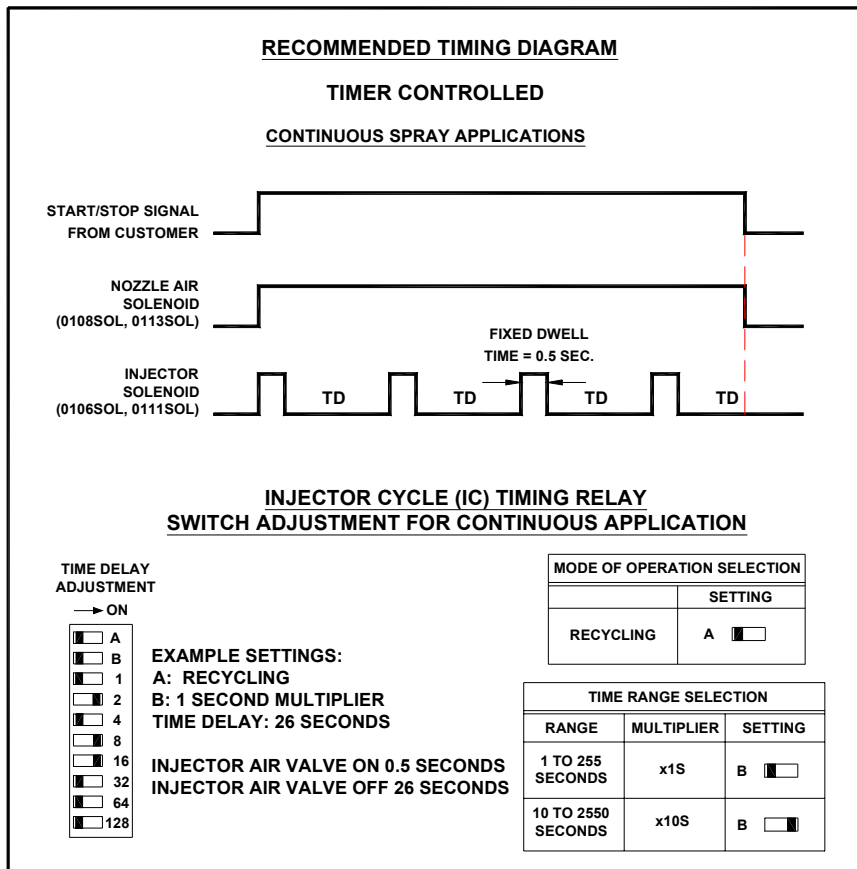
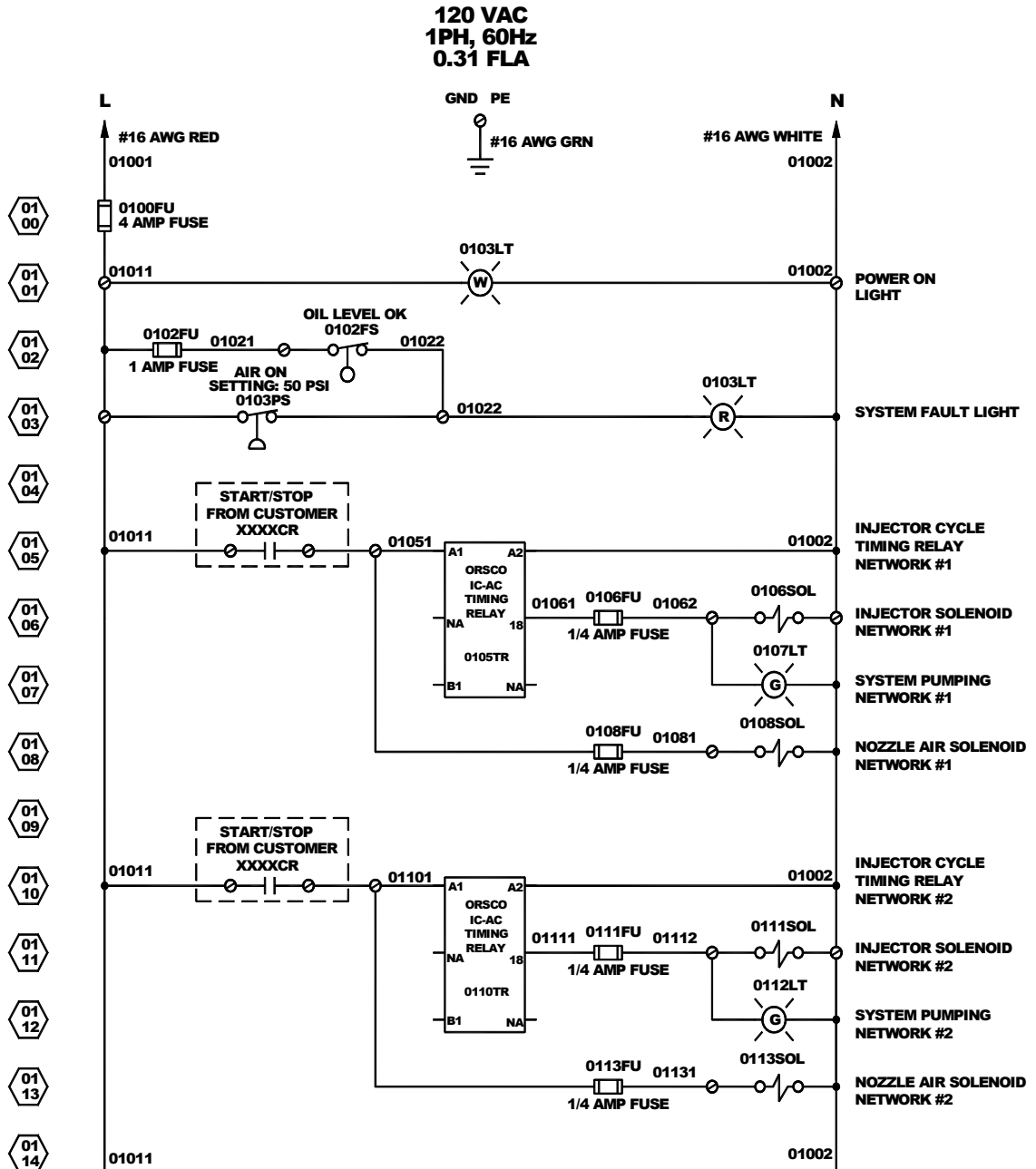


Fig. 2 Recommended Timing Diagram: Timer Controlled (Continuous)

Sample Timer Controlled Electrical Diagram
120 VAC, Dual Network System, Continuous Application



Pulsed Spray application: For this configuration the Start/Stop signal is based on an external sensor detecting object presence. The external sensor triggers the IC Timer to begin the cycle. The IC Timer (in “Single-Shot” mode) will initiate one cycle for both the injector air and nozzle air valves. The duration of this cycle is adjustable, however only one cycle of the injector will be completed regardless of the duration (Reference Fig. 3).

For this control scheme both the injector air and nozzle air valve are activated off the same output of the IC timer (Reference sample diagram on Pg. 7).

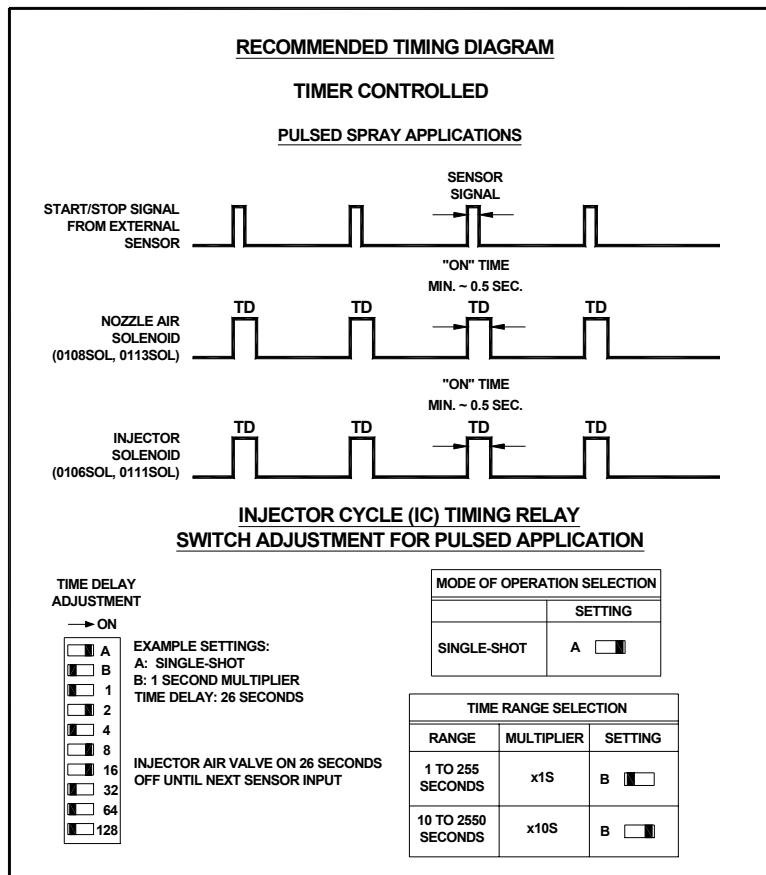
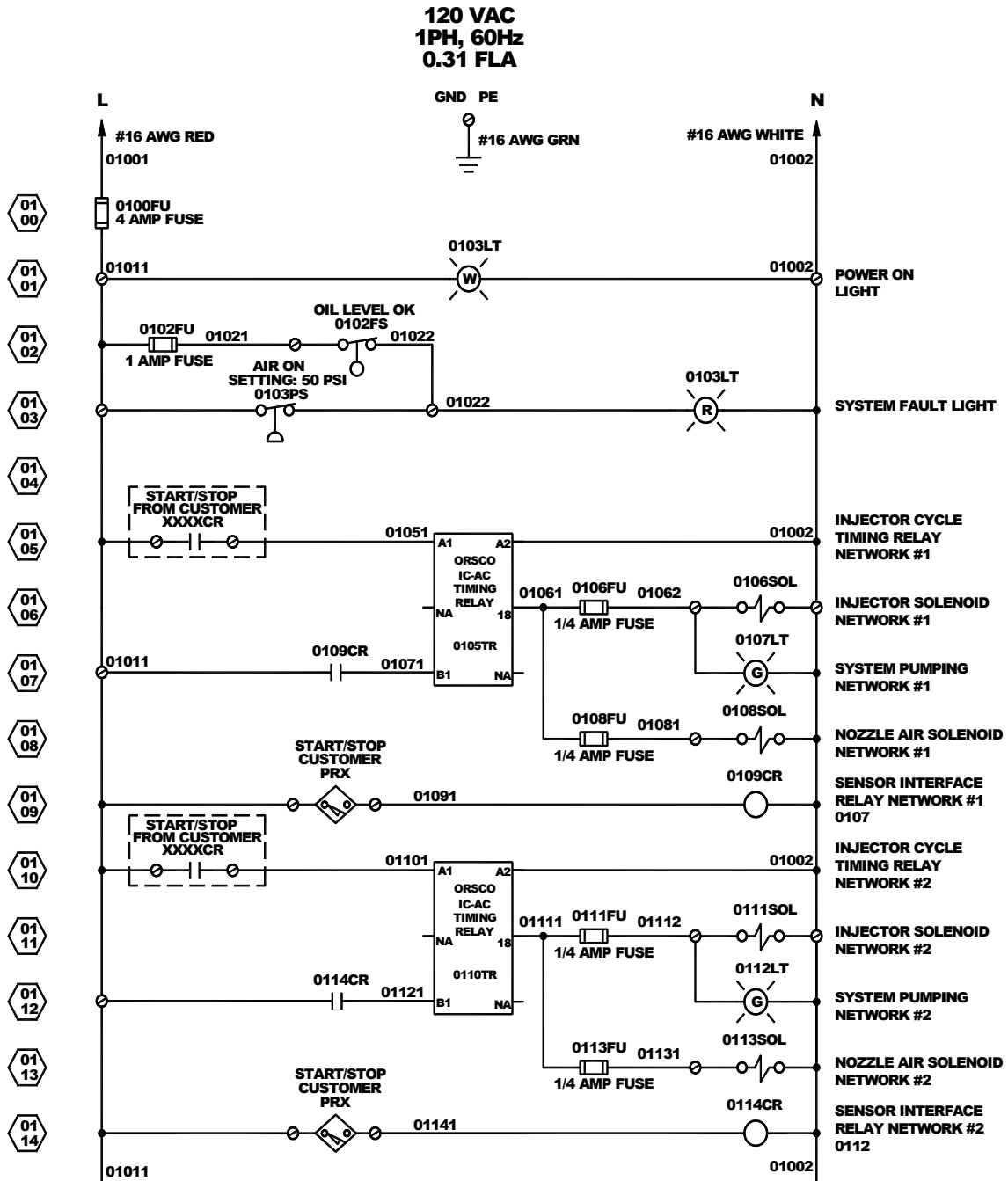
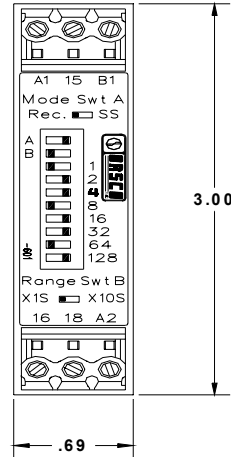
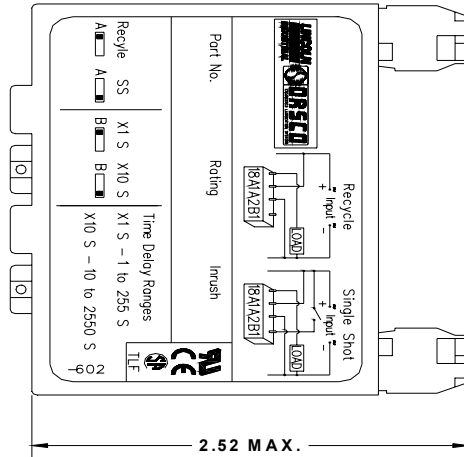


Fig. 3 Recommended Timing Diagram: Timer Controlled (Pulsed)

Sample Timer Controlled Electrical Diagram
120 VAC, Dual Network System, Pulsed Application



IC-AC/IC-DC TIMER MODULE



Mode of Operation: Single Shot or Recycling mode, dip switch selectable adjustable “ON” and “OFF” times. (“ON” time first).

Time Delay:

Type: Microcomputer based with ceramic resonator and watchdog circuitry.
Adjustment Range:

- 1). “ON” Time: Factory preset at 0.5 seconds.
- 2). “OFF” Time: 8 switches adjust the “OFF” time delay

Range: One switch selects 1 of 2 multipliers

X1S = 1 to 255 seconds in 1 second increments.

X10S = 10 to 2550 seconds in 10 second increments

Repeat accuracy: $\pm 0.1\%$ or ± 16 milliseconds, whichever is greater.

Setting accuracy: $\pm 2\%$ or ± 50 milliseconds, whichever is greater.

Recycle Time: 300 milliseconds maximum.

Initiate Time: 32 milliseconds maximum.

Time Delay vs. Temperature and Voltage: $\pm 2\%$ or ± 50 milliseconds, whichever is greater.

Input:

IC-AC (#702-10006): 24 VAC to 240 VAC, -20% to +10%, 50/60Hz.

IC-DC (#702-10007): 9 VDC to 135 VDC

Outputs:

Type: Solid State

Form: Normally open

Rating: 0.7A steady state, 10 Amp inrush

Voltage Drop: (AC) 2.5V typical @ 0.7A

(DC) 2.5V typical @ 0.7A

Protection:

IEEE 587 Level A

Dielectric breakdown: 2000 Volts RMS minimum @ 60 Hz.

Mechanical:

Mounting: Snap on to 32mm DIN1 & 35mm DIN 3 rail

Termination: 0.197” Push on terminal blocks for up to 14 AWG wire.

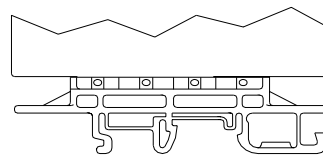
Environmental:

Operating temperature: -40°C to +60°C (-100°F to +140°F)

Storage temperature: -40°C to +85°C (-100°F to +140°F)

Humidity: 95% relative, non-condensing

DIN RAIL MOUNT ADAPTOR



Relay Controlled

The "Relay" system allows the customer to control the "On/Off" time of the lubrication system via an internal timer. This type of system has an internal System Cycle (SC) Timing Module to control "On/Off" cycle time of the lubrication system. The customer is responsible for the following:

- 1). Constant power supply for level and pressure switch fault indicator.
(Reference system prints for power requirements.)
- 2). Internally set IC Timer for desired injector "off" time, thereby setting injector cycle time.
- 3). Internally set SC Timer for desired system cycle time.

Continuous/Pulsed Spray applications:

For this configuration the applications are controlled internally in the same manner as the Timer controlled systems. Reference Fig. 4.

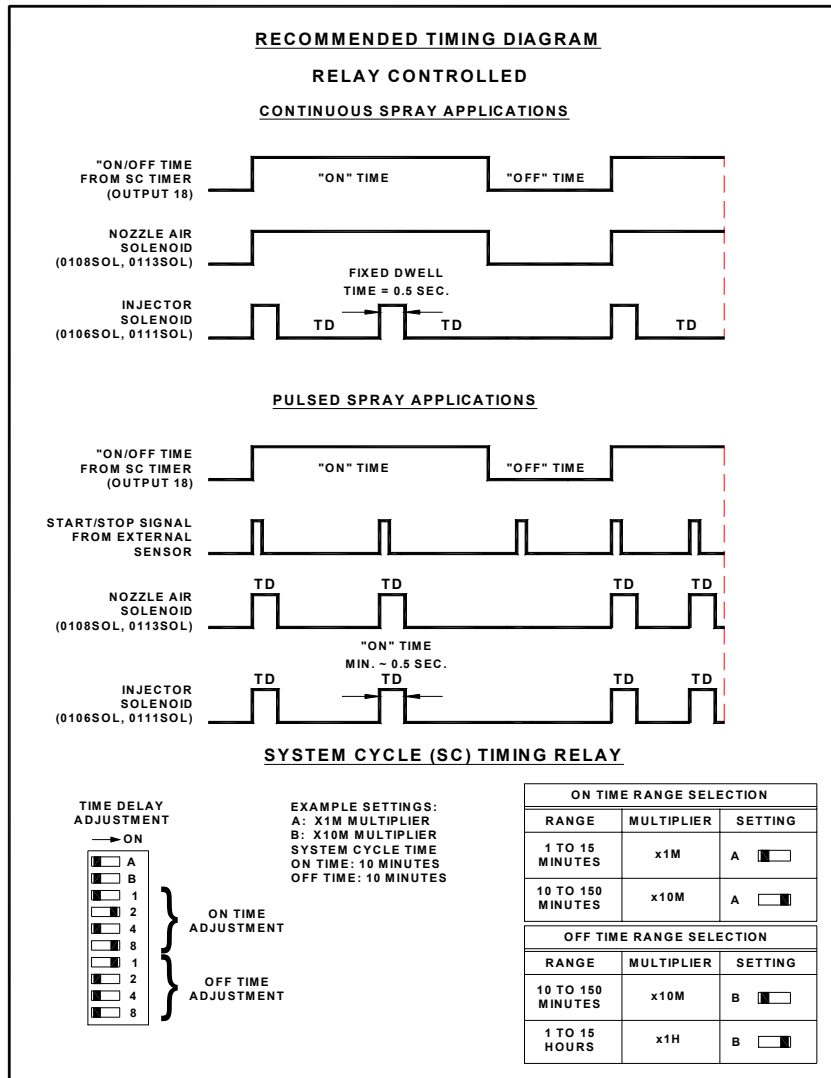
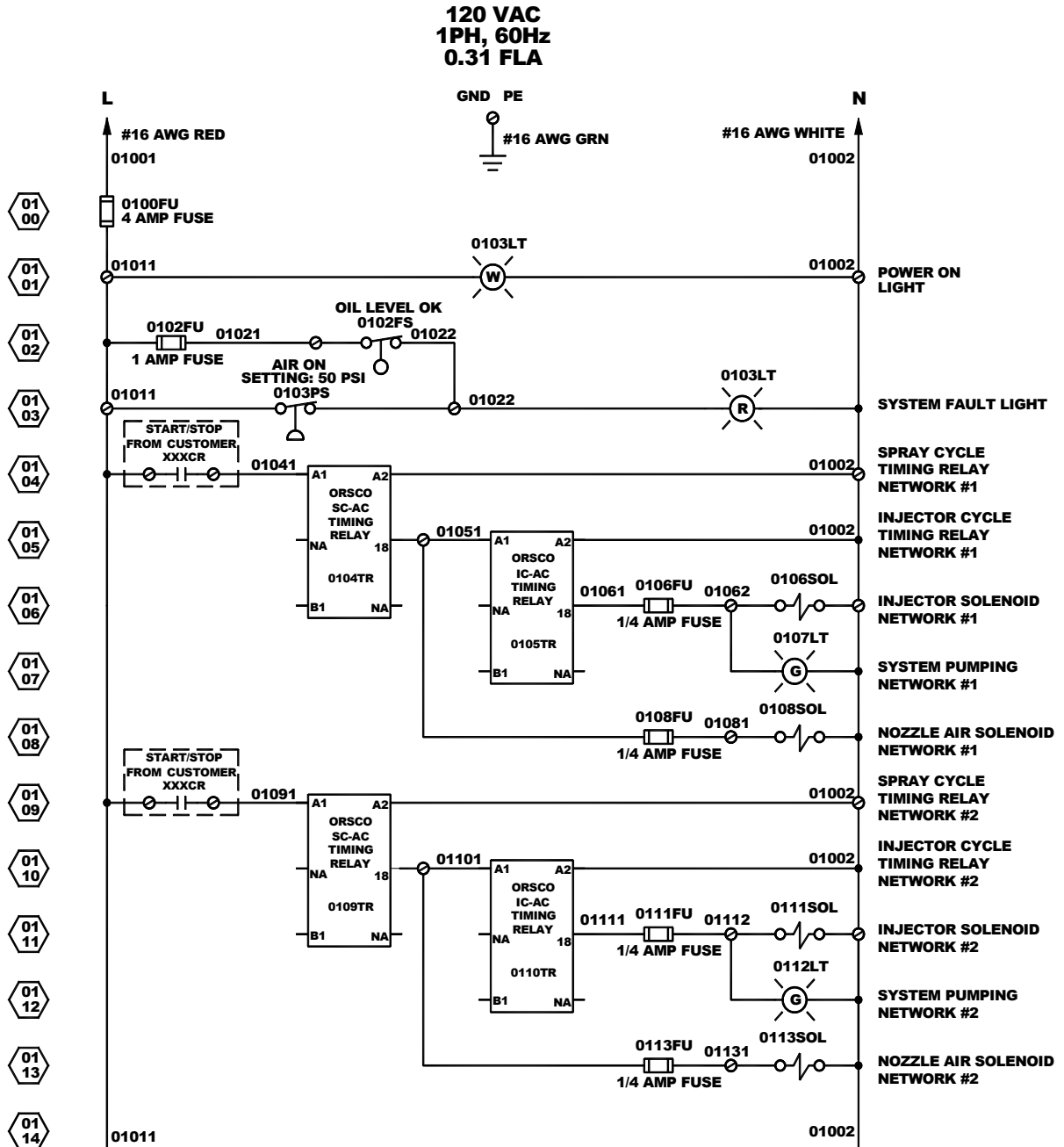
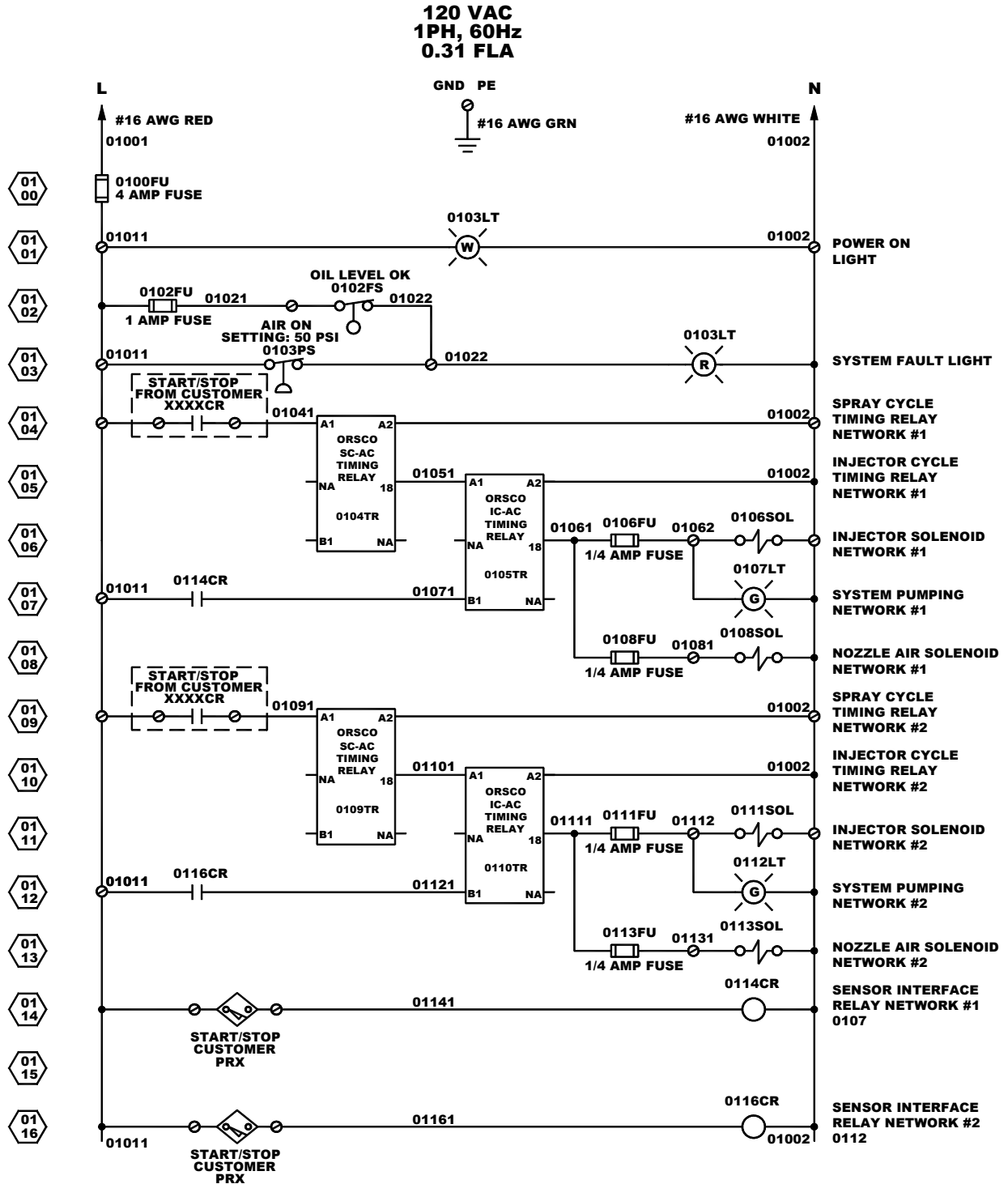


Fig. 4 Recommended Timing Diagram: Relay Controlled

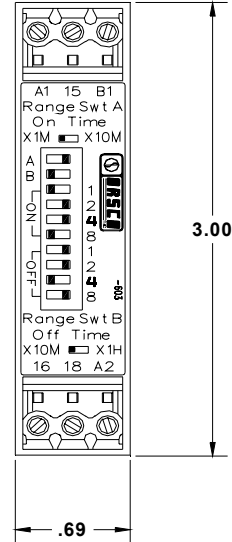
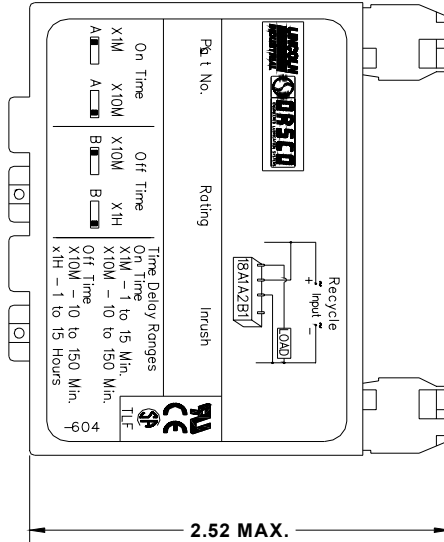
Sample Relay Controlled Electrical Diagram
120 VAC, Dual Network System, Continuous Application



Sample Relay Controlled Electrical Diagram
120 VAC, Dual Network System, Pulsed Application



SC-AC/SC-DC TIMER MODULE



Mode of Operation: Recycling mode, dip switch selectable adjustable "ON" and "OFF" times. ("ON" time first).

Time Delay:

Type: Microcomputer based with ceramic resonator and watchdog circuitry.
Adjustment Range:

- "ON" Time: 4 switches adjust the "ON" time delay
Range: One switch selects 1 of 2 multipliers
X1M = 1 to 15 minutes in 1 minute increments.
X10M = 10 to 150 minutes in 10 min. increments
- "OFF" Time: 4 switches adjust the "OFF" time delay
Range: One switch selects 1 of 2 multipliers
X10M = 10 to 150 minutes in 10 min. increments
X1H = 1 to 15 hours in 1 hour increments

Repeat accuracy: $\pm 0.1\%$ or ± 16 milliseconds, whichever is greater.
Setting accuracy: $\pm 2\%$ or ± 50 milliseconds, whichever is greater.
Recycle Time: 300 milliseconds maximum.
Initiate Time: 32 milliseconds maximum.
Time Delay vs. Temperature and Voltage: $\pm 2\%$ or ± 50 milliseconds, whichever is greater.

Input:

SC-AC (#702-10004): 24 VAC to 240 VAC, -20% to +10%, 50/60Hz.
SC-DC (#702-10005): 9 VDC to 135 VDC

Outputs:

Type: Solid State Form: Normally open
Rating: 0.7A steady state, 10 Amp inrush
Voltage Drop: (AC) 2.5V typical @ 0.7A
(DC) 2.5V typical @ 0.7A

Protection: IEEE 587 Level A

Dielectric breakdown: 2000 Volts RMS minimum @ 60 Hz.

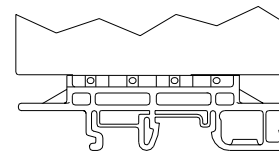
Mechanical:

Mounting: Snap on to 32mm DIN1 & 35mm DIN 3 rail
Termination: 0.197" Push on terminal blocks for up to 14 AWG wire.

Environmental:

Operating temperature: -40°C to +60°C (-100°F to +140°F)
Storage temperature: -40°C to +85°C (-100°F to +140°F)
Humidity: 95% relative, non-condensing

DIN RAIL MOUNT ADAPTOR



Series 170 Electrical Spare Parts List**Description:****Orsco Item Number:**

| | |
|-----------------------------|-----------|
| 120 VAC Green Pilot Light | 642-91027 |
| 120 VAC Red Pilot Light | 642-91028 |
| 120 VAC White Pilot Light | 642-99182 |
| 24 VDC Green Pilot Light | 642-91029 |
| 24 VDC Red Pilot Light | 642-91030 |
| 24 VDC White Pilot Light | 642-99183 |
| 240 VAC Green Pilot Light | 642-91032 |
| 240 VAC Red Pilot Light | 642-91031 |
| 240 VAC White Pilot Light | 642-99292 |
| IC-AC Injector Timer Module | 702-10006 |
| IC-DC Injector Timer Module | 702-10007 |
| SC-AC System Timer Module | 702-10004 |
| SC-DC System Timer Module | 702-10005 |
| 1/4 Amp Fuse | 108-07111 |
| 1 Amp Fuse | 108-07117 |
| 2.5 Amp Fuse | 108-91093 |
| 4 Amp Fuse | 108-07110 |
| 30 Amp Disconnect Switch | 349-07300 |

ORSCO
Lubrication Systems



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