

Model NG-1 1150, NG-1 1500, NG-1 2000, and NG-1 3000 Stand-Alone Nitrogen Generator

General Description

The TYCO NG-1 1150, NG-1 1500, NG-1 2000, and NG-1 3000 Stand-Alone Nitrogen Generators are designed to facilitate the Dry Pipe Nitrogen Inerting (DPNI) process for controlling oxygen corrosion in dry and preaction fire sprinkler systems, and provide supervisory maintenance gas. Designed for “plug and play” performance in a typical dry or preaction fire sprinkler system, the nitrogen generator utilizes membrane separation technology that produces 98%+ nitrogen on demand without the need for nitrogen storage.

The Nitrogen Generator is an on-site nitrogen generation system that is designed to be installed in-line between the compressed air supply and the sprinkler system riser(s). The system provides DPNI for single or multiple zones depending on:

- the number of systems,
- the volume of the largest system
- the cumulative volume of all systems being supplied

The generator includes an external bypass valve for maintenance or for “fast fill” needs to meet the NATIONAL FIRE PROTECTION AGENCY (NFPA) 13 30-minute fill requirement for dry pipe and preaction fire protection systems.

The Nitrogen Generator is designed to nitrogen inert all of the zones being served within 14 days. Thereafter, it will continue to automatically provide supervisory nitrogen gas sufficient for pressure maintenance of the fire sprinkler system(s).

The Nitrogen Generator facilitates the patented “fill and purge” breathing process in the fire sprinkler system when paired with an oxygen removal vent installed on the sprinkler riser such as the TYCO Manual Air Vent (TAV-D) or the TYCO Dry SMART Vent (TSV-D).

IMPORTANT

Refer to Technical Data Sheet TFP2300 for warnings pertaining to regulatory and health information.

Refer to TFP1262 for more information on TYCO Dry Air Vent (TAV-D), and to TFP1263 for more information on TYCO SMART Air Vent (TSV-D).

System Assembly

The TYCO Nitrogen Generator unit includes the following components:

- Steel enclosure cabinet with membrane type nitrogen generator (no nitrogen gas storage) and manual bypass
- Power supply:
120 VAC/Single phase/60Hz
(230 VAC/Single phase/50Hz)
- Single point nitrogen/air discharge – 1/2 in. NPT
- Hour Run Meter
- Cycle Counter

System Status

The TYCO Nitrogen Generator includes the following system status indicators:

- Bypass Mode Alarm Indicator - Nitrogen generator is in the By-Pass mode (flashing indicator). See Figure 4.
- Leak Monitoring Alarm - Nitrogen generator is running excessively (audible signal).

System Input/Output Signals

The TYCO Nitrogen Generator includes the following monitoring outputs:

Digital Outputs

- Power On/Off
- Bypass Mode Alarm
- Nitrogen Generator Running
- Leak Monitoring

Analog Outputs

- Nitrogen Supply Line Pressure

Support Equipment

The Nitrogen Generator is designed to be used in conjunction with the TYCO AMD-1 Air Maintenance Device, the TYCO Handheld Gas Analyzer (THGA), and the Riser-mounted TYCO Dry Air Vent (TAV-D), or TYCO Dry SMART



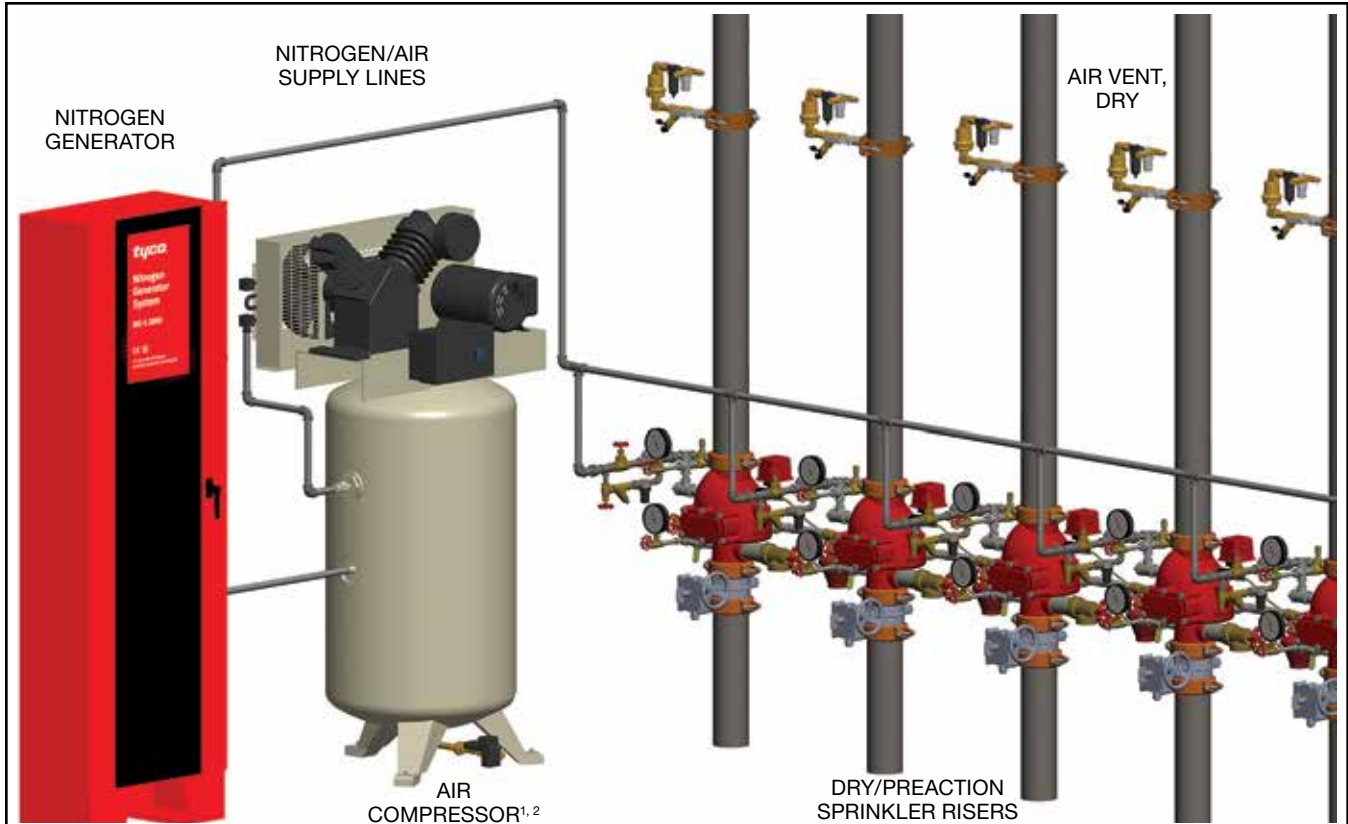
Vent (TSV-D), as part of the complete Dry Pipe Nitrogen Inerting (DPNI) system. Refer to TFP1267 for more information on the TYCO Handheld Gas Analyzer.

The TYCO Nitrogen Generator can be used with the following optional equipment:

- TYCO Model TSGA SMART Gas Analyzer - one for each nitrogen generator is recommended. Refer to TFP1270 Model TSGA SMART Gas Analyzer for more information.
- TYCO Model TILD In-Line Corrosion Detector - monitoring at least one for each sprinkler system is recommended. Refer to Technical Data Sheet TFP1261 TYCO Model TILD In-Line Corrosion Detector for more information.

TYCO NG1 Compressors

The TYCO NG1 Compressors are paired with the TYCO NG-1 1150, NG-1 1500, NG-1 2000, and NG-1 3000 Nitrogen Generator in facilitating the Dry Pipe Nitrogen Inerting (DPNI) process in dry and preaction fire sprinkler systems as well as Wet Pipe Nitrogen Inerting (WPNI) process in wet pipe sprinkler systems. The air compressors



Notes:

1. The Americas compressor vertical tank arrangement is shown. The EMEA and APAC compressor tank is a horizontal arrangement.
2. See Table C for compressor dimensions for your region.

FIGURE 1
MODEL NG-1 1150, NG-1 1500, NG-1 2000, AND NG-1 3000 STAND-ALONE NITROGEN GENERATOR INSTALLATION SCHEMATIC

Model Number	Cabinet Without Bypass			Cabinet With Bypass			Weight Lbs (kg)
	Width Inches (mm)	Height Inches (mm)	Depth Inches (mm)	Width Inches (mm)	Height Inches (mm)	Depth Inches (mm)	
NG-1 1150 NG-1 1500	24.5 (622)	52.5 (1334)	8.5 (216)	32.5 (826)	52.5 (1334)	8.5 (216)	152 (69)
NG-1 2000 NG-1 3000	24.5 (622)	76 (1930)	12.5 (318)	32 (813)	76 (1930)	12.5 (318)	300 (136)

TABLE A
MODEL NG-1 1150, NG-1 1500, NG-1 2000, AND NG-1 3000 STAND-ALONE NITROGEN GENERATOR DIMENSIONS AND WEIGHT

Model Number	Min. Supply Air SCFM (L/min)	Total System Capacity Gal. (L)	Single System Capacity ^a at 40 psig (2,8 bar) Gal. (L)	Single System Capacity ^a at 20 psig (1,4 bar) Gal. (L)
NG-1 1150	14.3 (405)	6500 (24605)	1150 (4353)	2300 (8706)
NG-1 1500	24.3 (688)	11000 (41640)	1440 (5451)	2880 (10902)
NG-1 2000	24 (688)	18500 (70030)	2025 (7666)	4050 (15331)
NG-1 3000	35 (992)	22500 (85172)	2900 (10978)	5800 (21955)

Notes:

- a. Capacity based on NFPA 13 30-minute fill requirement of largest single system

TABLE B
MODEL NG-1 1150, NG-1 1500, NG-1 2000, AND NG-1 3000 STAND-ALONE NITROGEN GENERATOR OPERATING PERFORMANCE

Model Number	Width Inches (mm)		Length Inches (mm)		Height Inches (mm)		Weight Lbs (kg)	
	Americas	RoW	Americas	RoW	Americas	RoW	Americas	RoW
TNGC-1150	20 (508)	21 (533)	32 (813)	60.6 (1540)	70 (1778)	43.7 (1111)	435 (197)	374.9 (170)
TNGC-1500/2000	23.6 (599)	23.3 (592)	38.1 (968)	60.6 (1540)	70.1 (1781)	47.2 (1200)	573 (260)	416.7 (189)
TNGC-3000	43.2(1097)	23.9 (606)	30 (762)	60.6 (1540)	76.6 (1946)	47.2 (1200)	800 (362)	443.2 (201)

NOTES

- RoW = Rest of World - the EMEA and APAC regions.

TABLE C
MODEL NG1 COMPRESSOR DIMENSIONS AND WEIGHT - AMERICAS AND REST OF WORLD REGIONS

work in conjunction with the NG-1 1150, NG-1 1500, NG-1 2000, and NG-1 3000 Nitrogen Generators in a typical dry or preaction fire sprinkler system. It is also a plant nitrogen source for wet pipe fire sprinkler systems used with the NG-1 1500, NG-1 2000, and NG-1 3000 Nitrogen Generators.

The NG1 Air Compressors consists of the following features:

TNGC-1150

- 5 hp
- Used with Model NG-1 1150
- Air receiver tank:
 - Americas: 60 gal (227 L); vertical
 - EMEA, APAC: 71 gal (270 L); horizontal

TNGC-1500/2000

- 7.5 hp
- Used with Model NG-1 1500 or NG-1 2000
- Air Receiver Tank:
 - Americas: 80 gal (303 L); with after cooler; vertical
 - EMEA, APAC: 71 gal (270 L); horizontal

TNGC-3000

- 10 hp
- Used with Model NG-1 3000
- Air Receiver Tank
 - Americas: 120 gal (488 L); with after cooler; vertical
 - EMEA, APAC: 71 gal (270 L); horizontal

NOTICE

The TYCO Stand-Alone Nitrogen Generators described herein must be installed and maintained in compliance with this document, in addition to the standards of any other authorities having jurisdiction. Failure to do so may impair the performance of the related devices.

The owner is responsible for maintaining their fire protection system

and devices in proper operating condition. Contact the installing contractor or product manufacturer with any questions.

Technical Data

NG-1 Nitrogen Generators

Approvals

FM Approved
Compliance with CE Pressure Equipment
UL508A Listed Industrial Control Panel

Cabinet Dimensions

See Table A

Weight

See Table A

Operating Performance

See Table B

Temperature Range

40°F (5°C) to 105°F (40°C)

Power Supply

120 VAC/Single 1 phase/60Hz (dedicated circuit)
230 VAC/Single phase/50Hz (dedicated circuit)

Power Consumption

2 amps

Gas Connection

Air Inlet - 1/2 in. NPT Female
Nitrogen Outlet - 1/2 in. NPT Female

Drain Connection

1/4 in. NPT Connection

Nitrogen Quality

N₂ Purity at Discharge: 98% or greater (maximum of 2.0% oxygen)

N₂ Pressure at Discharge: Minimum of 15 psig (1 bar); Max of feed air pressure minus 15 psig (1 bar)

N₂ Water Dew Point: Typically less than -70°F (-57°C)

Note: *When connecting a TYCO Stand-Alone Nitrogen Generator to an existing dry pipe/preaction fire sprinkler system, the existing fire sprinkler system(s) must be limited to a maximum leak rate of less than 6 psig (0.4 bar) within a 24 hour period, per system.*

NG1 Compressors

Air Compressor Dimensions

See Table C

Weight

See Table C

Operating Performance

See Table B

Temperature Range

40°F (5°C) to 105°F (40°C)

Power Supply

Americas:

- 460 VAC/Three phase/60 Hz (Standard)
- 208 VAC/Three phase/60 Hz (Optional)

EMEA and APAC:

- 400 VAC/Single phase/50Hz (Standard)

Note: *Other configurations are available. Contact Johnson Controls Technical Services for more information.*

Auto Drain

- 120 VAC/Single phase/60Hz
- 220 VAC/1 phase/50Hz

Note: *The auto drain can be connected to the Nitrogen Generator cabinet power supply.*

Power Consumption

Americas:

TNGC-1150 7.6 Amps @ 460 VAC
17.5 Amps @ 208 VAC

TNGC-1500/2000 11 Amps @ 460 VAC
25.3 Amps @ 208 VAC

TNGC-3000 14 Amps @ 460 VAC
32.2 Amps @ 208 VAC

EMEA and APAC:

TNGC-1150 13 Amps @ 400 VAC
TNGC-1500/2000 17 Amps @ 400 VAC
TNGC-3000 22 Amps @ 400 VAC

Air Connection

Americas:

TNGC-1150 1/2 in. NPT Female
TNGC-1500/2000 1/2 in. NPT Female
TNGC-3000 1 in. Female

EMEA and APAC:

TNGC-1150 1/2 in. BSPP Female
TNGC-1500/2000 1/2 in. BSPP Female
TNGC-3000 1/2 in. BSPP Female

Drain Connection

Americas:

TNGC-1150	1/4 in. NPT Female
TNGC-1500/2000	1/2 in. NPT Female
TNGC-3000	1/2 in. NPT Female

EMEA and APAC:

TNGC-1150	1/2 in. BSPP Female
TNGC-1500/2000	1/2 in. BSPP Female
TNGC-3000	1/2 in. BSPP Female

Installation

The TYCO NG-1 1150, NG-1 1500, NG-1 2000, and NG-1 3000 Stand-Alone Nitrogen Generators must be installed in accordance with this section.

WARNING

Do not operate the TYCO Nitrogen Generator if damaged during shipment, handling or use. Failure to do so may result in personal injury or property damage.

Operation of the nitrogen membrane above the rated design pressure could be hazardous. Do not connect the nitrogen generation equipment to compressed air sources that can exceed the maximum rated pressure without installing pressure controls and safety relief devices in the compressed air supply line.

Specific procedures must be developed for maintenance and servicing of the equipment where the nitrogen membrane is located. Appropriate labels must be continuously displayed in all areas where personnel might be exposed to a nitrogen atmosphere under normal and abnormal conditions.

Nitrogen is nontoxic and largely inert. Rapid release of nitrogen gas into an enclosed space displaces the oxygen and can cause an asphyxiation hazard.

CAUTION

Do not install the TYCO Nitrogen Generator or Air Compressor Package in an area where ammonia, sulfur dioxide, hydrogen sulfide, mercaptans, chlorides, chlorine, oxides of nitrogen, acid fumes, solvent vent vapors, and ozone vapors or similar contaminants exist. The equipment can be damaged by ammonia and other vapors shortening membrane life.

NG-1 Nitrogen Generators

Step 1: Mounting the Stand-Alone Nitrogen Generator

The TYCO Stand-Alone Nitrogen Generator is designed to be mounted directly to the floor and/or the wall at the installation location. Several factors should be considered in choosing the proper mounting location for the nitrogen generator:

- Access to the power supply (dedicated circuit)
- Access to the air source supplied to the nitrogen generator
- Access to the sprinkler riser being supplied from the nitrogen generator
- Access to drain for the condensate discharge line
- Clearance at the front of the unit to open cabinet door
- Clearance around ventilation vents on side and bottom for proper cabinet ventilation
- When floor mounting the cabinet, ensure floor is flat and level
- If wall mounting the cabinet, ensure the wall is capable of supporting the weight of the generator cabinet

The cabinet includes pre-punched holes in the feet for floor mounting and holes in the back panel for wall mounting using standard anchors.

Step 2: Power Supply

The Nitrogen Generator requires a dedicated power supply that connects to the terminal blocks in the nitrogen generator cabinet. See Figure 2A or 2B as applicable.

Step 3. Plumb the Nitrogen/Air Supply Line

The nitrogen/air discharge plumbing from the nitrogen generator is to be connected directly to the sprinkler system valve trim using a minimum of 1/2 in. to 1 in. black steel, galvanized steel or copper piping. The size of the nitrogen/air supply line is to be based on the length of pipe between the nitrogen generator and the fire sprinkler systems along with the total volume of the fire sprinkler systems being supplied. The nitrogen generator requires an in-line Air Maintenance Device (AMD) that is equipped with an on-board field adjustable pressure regulator for each zone being served. The preferred AMD is the TYCO AMD-1. Refer to technical datasheet TFP1221.

Note: *When both dry pipe and preaction fire sprinkler systems are connected to one nitrogen generator, additional equipment may be required if the fire sprinkler systems operate at different supervisory gas pressures.*

Step 4: Plumb the Condensate Drain Line

The Stand-Alone Nitrogen Generator will occasionally discharge a small amount of condensate water from the coalescing filters inside the cabinet. It is recommended that the 1/4 in. drain connection be plumbed to a floor drain or building exterior. When plumbing to a drain is not feasible an evaporative collection chamber can be used.

Step 5: System Signals and Monitoring (where used)

The nitrogen generator cabinet has two system signals and five outputs that can be monitored by the facility's BMS or fire alarm system as shown in Figure 2A or 2B as applicable.

- Bypass Alarm - The nitrogen generator is operating in the bypass mode which is activated when the bypass valve is in the "FAST FILL" position to fast fill the fire sprinkler system and the air supplied directly from the air compressor has reached a pressure of 20 psig (1,4 bar). (Flashing amber light)
- Leak Monitor - The nitrogen generator is equipped with a leak monitor audible signal which is activated when the nitrogen generator runs excessively. (Audible signal)

The nitrogen generator cabinet includes system monitoring signals which can be monitored through a building monitoring system, if desired:

- Nitrogen Generator Running - Form C contacts
- Bypass Mode Alarm - Form C contacts
- Nitrogen Generator Power Monitoring - Form C contacts
- Leak Monitoring - Form C contacts
- Nitrogen System Supply Line Pressure - Analog Signal

NG1 Compressors

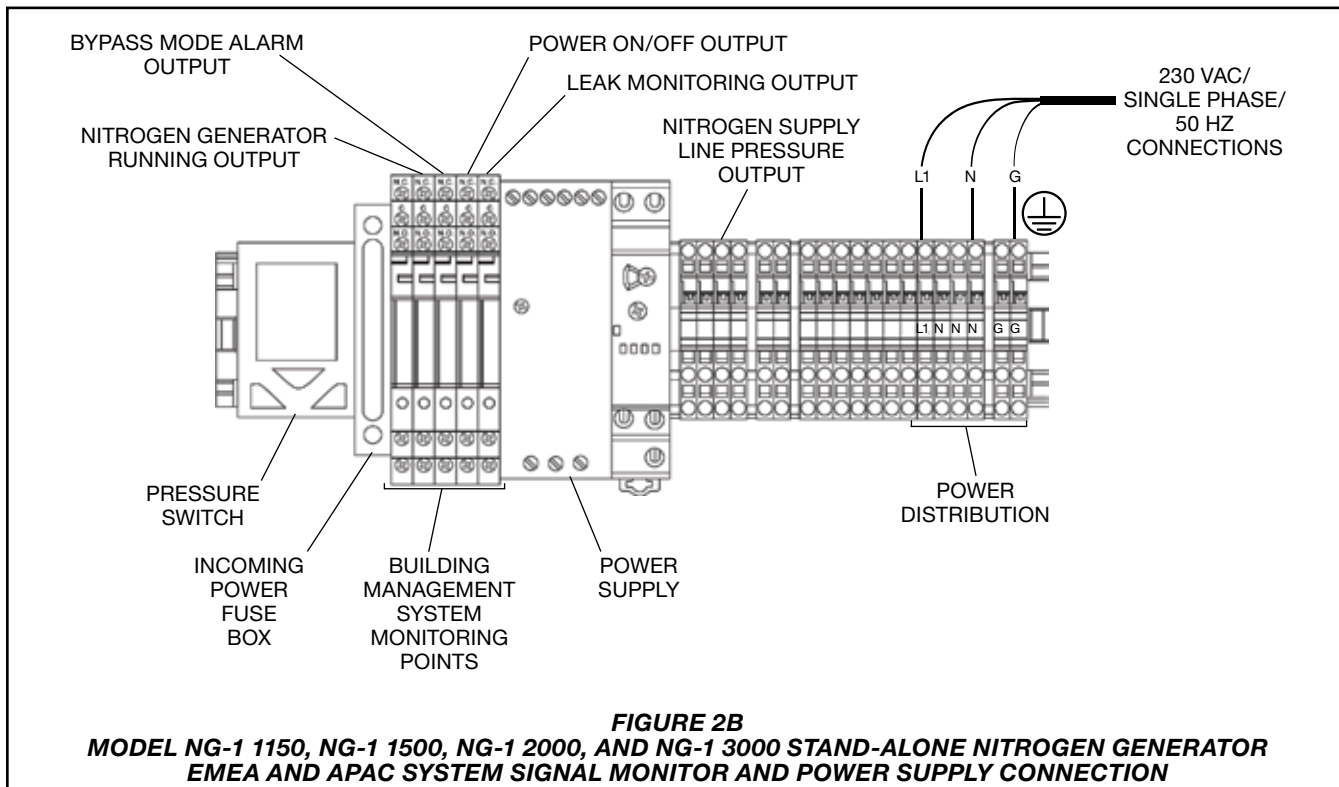
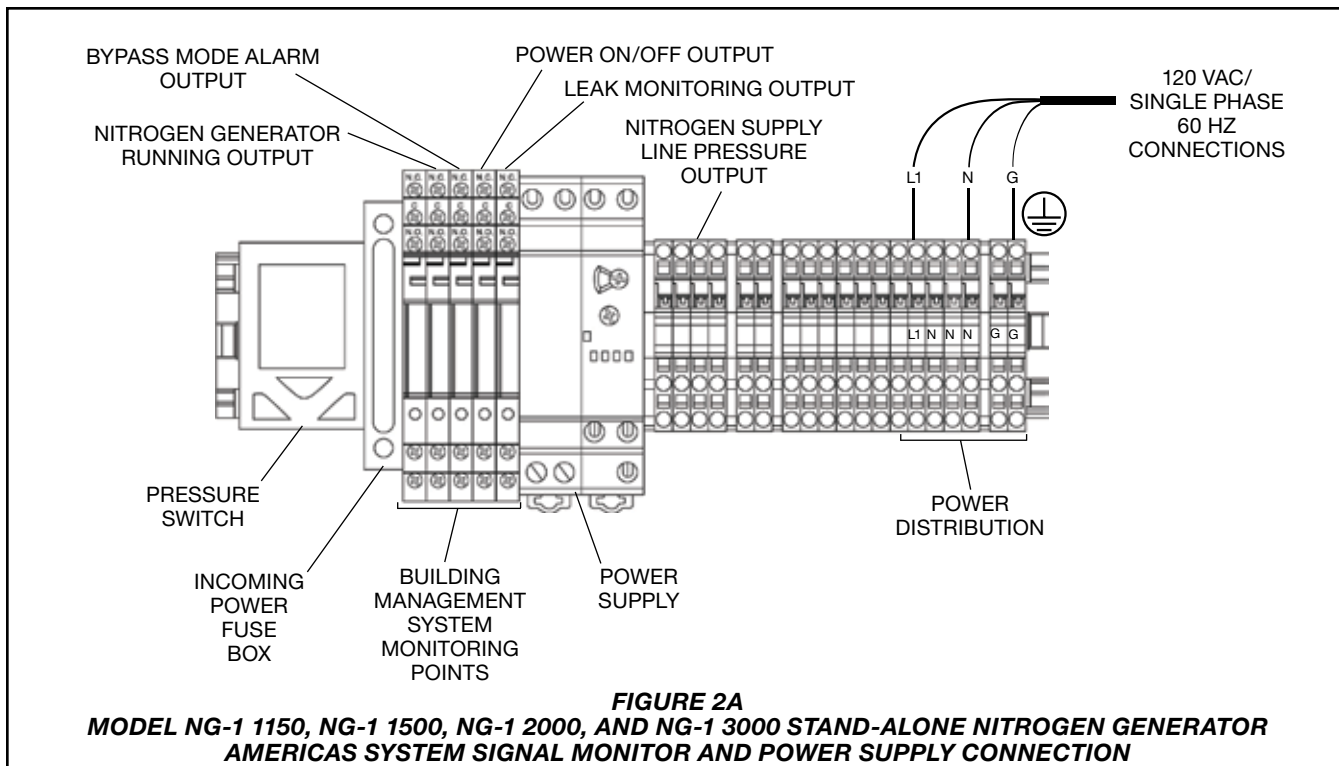
Step 1. Mounting the Air Compressor

The simplex air compressors are designed to be mounted directly to the floor in the fire sprinkler riser room. Several factors should be considered in choosing the proper mounting location for the air compressors:

- Access to the appropriate power supply (see Step 2 for power circuit requirements per compressor sizes)
- Access to the nitrogen generator inlet 1/2 in. supply line
- Access to a drain for the condensate discharge line
- Clearance to access air compressor for servicing

The air compressors come with pre-punched holes in the feet for easy mounting to the floor using standard anchors.

Note: *Vibration pads (supplied) must be installed under the feet of the air compressor to ensure warranty of the air compressor.*



Step 2. Power Supply

NOTICE

It is recommended that a service disconnect be provided adjacent to the air compressor.

The air compressors require a dedicated power supply that is terminated in the power supply box on the air compressor as shown in Figure 3A, 3B, or 3C as applicable. Verify the voltage of the power supply available for the air compressor is compatible with the voltage requirements of the air compressor.

NOTICE

With the TNGC-1500/2000 and the TNGC-3000, verify that the compressor and motor starter are configured for operating at 208 VAC/3 phase when providing 208 VAC/3 phase to the control box.

Step 3: Plumb the Air Supply Line

For compressors in the Americas, the air discharge plumbing from the air compressor is to be connected to the inlet of the nitrogen generator using 1/2 in. black steel, galvanized steel or copper lines. For compressors in EMEA and APAC, the air discharge plumbing should first be connected to the WSD-25 water separator which then is to be connected to the inlet of the nitrogen generator.

Step 4: Plumb the Condensate Drain Line

The TYCO oil-less air compressor will discharge condensate water from the air receiver tank. It is recommended that the 1/4 in. drain connection be plumbed to a floor drain or building exterior. When plumbing to a drain is not feasible an evaporative collection chamber can be used.

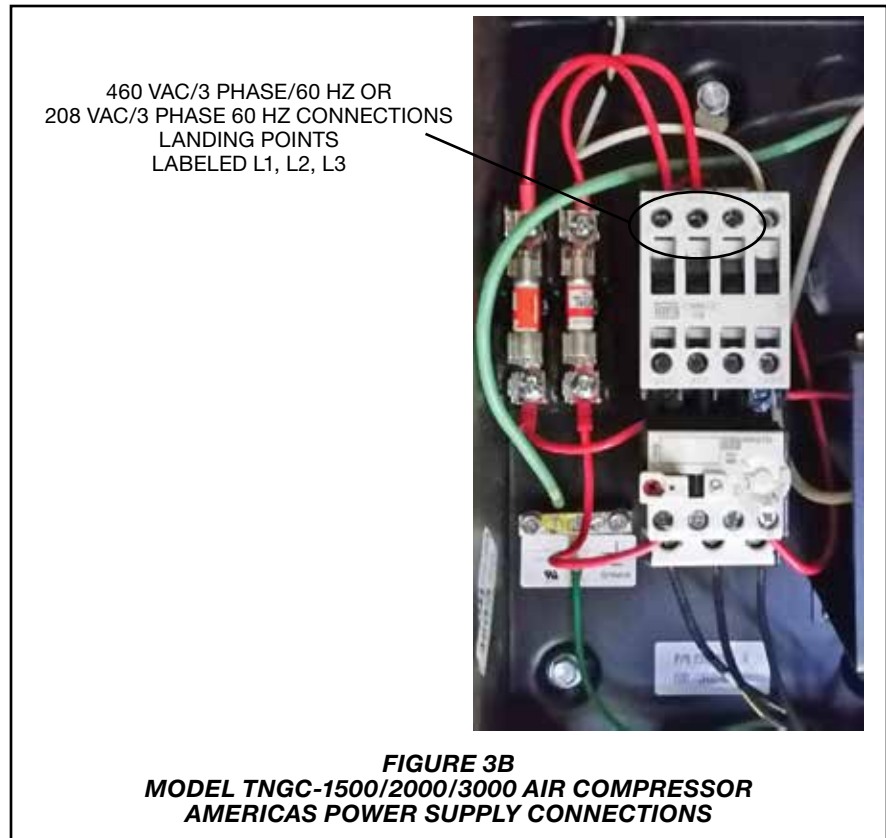
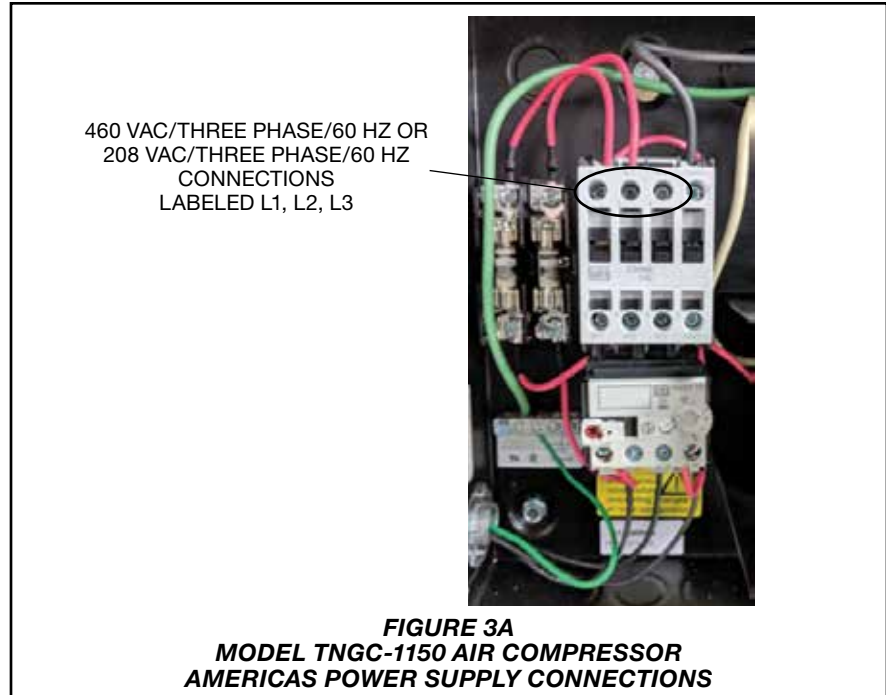
Note: *Ensure that the receiver tank auto-drain is connected to an un-switched power source: 120 VAC for Americas, 230 VAC for EMEA and APAC.*

Note: *The Low Oil Level Sensor on the air compressor automatically shuts down air compressor until the proper oil level has been restored.*

Care and Maintenance

Nitrogen Generators

The TYCO NG-1 1150, NG-1 1500, NG-1 2000, and NG-1 3000 Stand-Alone Nitrogen Generators, the TNGC-1150 Air Compressor, and TNGC-1500/2000 and 3000 Air Compressors must be maintained and serviced in accordance with this section.



Before closing a fire protection system main control valve for maintenance work on the fire protection system that it controls, permission to shut down the affected fire protection systems must first be obtained from the proper authorities. All personnel who may be affected by this decision must be notified.

Inspection, testing, and maintenance must be performed in accordance with the requirements of the NFPA, and any impairment must be immediately corrected.

The owner is responsible for the inspection, testing, and maintenance of their fire protection system and devices in

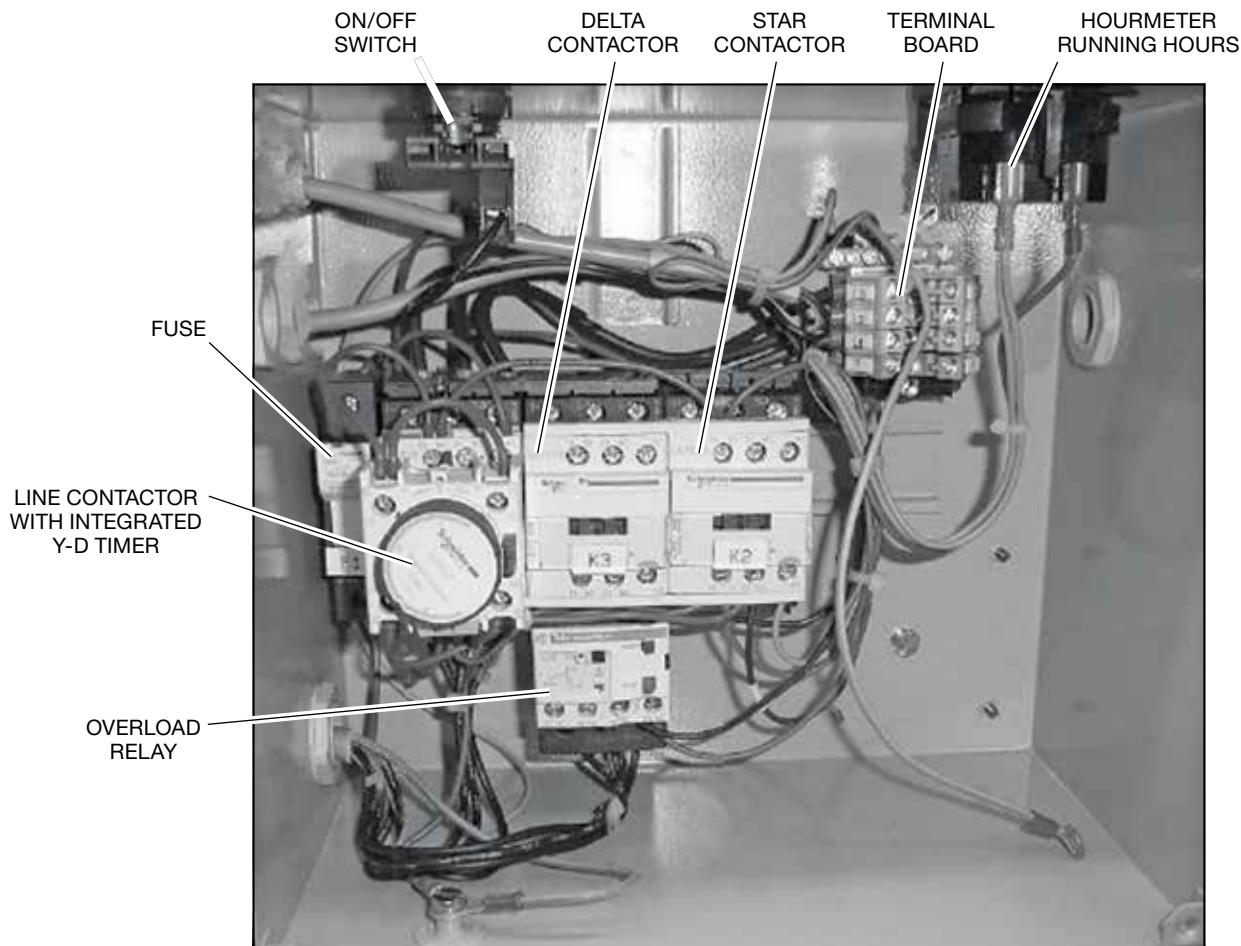


FIGURE 3C
MODEL TNGC-1150/1500/2000/3000 AIR COMPRESSOR
EMEA AND APAC POWER SUPPLY CONNECTIONS

compliance with this document, as well as with the applicable standards of any authorities having jurisdiction. Contact the installing contractor or product manufacturer with any questions.

Automatic sprinkler systems are recommended to be inspected, tested, and maintained by a qualified Inspection Service in accordance with local requirements and/or national codes.

Maintenance of the Nitrogen Generator

The nitrogen generator cabinet contains three separate cartridge filters. It is recommended that each of the filter cartridges be replaced as part of an annual preventative maintenance program. In some environments it may be necessary to replace filters more frequently. When maintained properly the nitrogen separation membrane will provide up to 20 years of service life.

Filter Replacement Procedure

With reference to Figure 4, perform the following steps when replacing the cartridge filters located in the Filter Housing.

Step 1. Turn the power supply to the unit off.

Step 2. Close the Inlet and Outlet Ball Valves, and open the Bypass Ball Valve.

Step 3. Depressurize the nitrogen generator internal inlet piping by slowly opening the Depressurization Ball Valve in the cabinet to the left of the filter housing.

Step 4. Remove the filter housing by pulling down on the blue housing lock and turning the filter housing counter-clockwise.

Step 5. Once the filter housing has been removed, the filter cartridge inside is removed by first unscrewing the black retaining disc at the base of the cartridge and then pulling down on the cartridge. Discard the old filter cartridge and replace it with the appropri-

ately marked filter cartridge from the filter replacement kit by pushing up so that it fits snugly onto the receiving cylinder in the upper part of the filter housing. Hand tighten the black retaining disc back onto the central metal threaded rod.

Step 6. Replace the filter housing by pushing up into position and turning the housing clockwise until blue housing lock locks into place.

Step 7. Repeat Step 4 through Step 6 for each additional filter.

Note: Filters 2 & 3 do not have a black retaining disc, filters screw directly into housing.

Step 8. Remove the Water Separator housing by pulling down on the blue housing lock and turning the housing counter-clockwise. Inspect the Water Separator and clean as necessary.

Step 9. Replace the Water Separator housing by pushing up into position and turning the housing clockwise until blue housing lock locks into place.

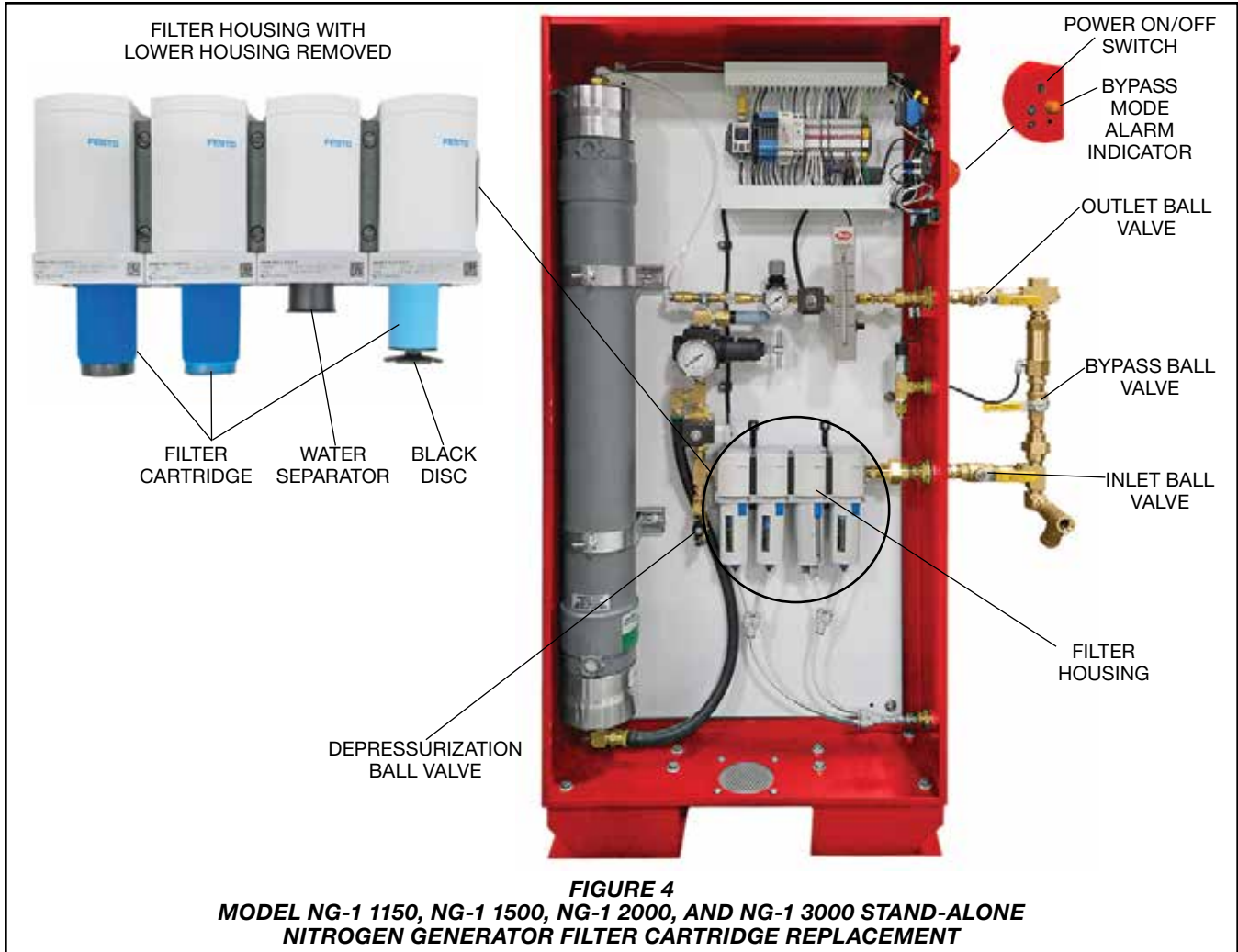


FIGURE 4
MODEL NG-1 1150, NG-1 1500, NG-1 2000, AND NG-1 3000 STAND-ALONE NITROGEN GENERATOR FILTER CARTRIDGE REPLACEMENT

Step 10. Close the depressurization ball valve. The Nitrogen Generator can now be placed back into service.

Step 11. Turn the power supply to the unit ON.

Step 12. Close the Bypass Ball Valve.

Step 13. Open the Inlet and Outlet Ball Valves.

Compressors

Maintenance of the Compressor
For compressor maintenance, please refer to the manufacturer's recommended maintenance plan in the owner's manual for the compressor.

Limited Warranty

For warranty terms and conditions, visit www.tyco-fire.com.

Ordering Procedure

TYCO will supply a list of required part numbers to order through regular sales channels. Contact your local business manager or sales person and specify the following:

Sizing of Nitrogen Generator

- Total cumulative size of all dry/preaction sprinkler systems
- Size of the largest single dry/preaction sprinkler system
- Total number of dry/preaction sprinkler systems
- Supervisory pressure of all dry/preaction sprinkler systems
- Required voltage needed for dry/preaction sprinkler system

Filter Replacement Kit

Filter Replacement Kit TNGFLT5

Optional Monitoring Equipment

Model THGA Handheld Gas Analyzer . . THGA01
Model TSGA SMART Gas Analyzer . . . TSGA01

Model TILD In-Line Corrosion Detector

Refer to Technical Data Sheet TFP1261 for ordering instructions.