

EMCARA

EMCARA GAS DEVELOPMENT INC.

Safety Technology for Alternative Fuel Systems

10,000 PSI LONG TRIGGER PRD - HYDROGEN LT224 Series

FEATURES

As the use of Hydrogen gained momentum, it was a natural progression for Emcara to create a Long Trigger, Hydrogen ready thermally activated Pressure Relief Device (HPRD). Our 10,000 psi PRD is the only thermally activated, Long Trigger Pressure Relief Device specifically designed for use with Hydrogen systems. Surface finishes, material treatments and internal mechanisms are designed to prevent Hydrogen embrittlement and operate at the higher pressures that are inherent with Hydrogen systems. Trigger lengths are comparable with Emcara's Viper PRD (up to 45 feet). Every 10,000 psi pressure relief device is tested for dimensional compliance and to exacting performance standards.

PERFORMANCE & GEOMETRY

Gas Type: Hydrogen

Pressure: 10,000 psi nominal

Activation Temperature: 110 °C

Activation Time: 30 seconds

Flow Rate: 970 SLPM (per HPRD1)

Minimum Exposure Length: 12"

Body Size: 1.5" x 2" x 2.25" / 37mm x 51mm x 57mm

Inlet Connection: 9/16" HP Port

Outlet Connection: SAE J1926-8 Port

Body Construction: Blue Anodized Aluminum

Tests that have been performed on Emcara's Hydrogen PRD:

- Cycle test with Nitrogen at 13,500 psi
- Hydro test at 22,500 psi
- Drop test based on HPRD1
- Bonfire test with a 1 m long trigger line with Nitrogen & Hydrogen
- Thermal activation test with Hydrogen
- Leak test based on HPRD1 with Hydrogen and Nitrogen

Tests that have been conducted on trigger mechanism

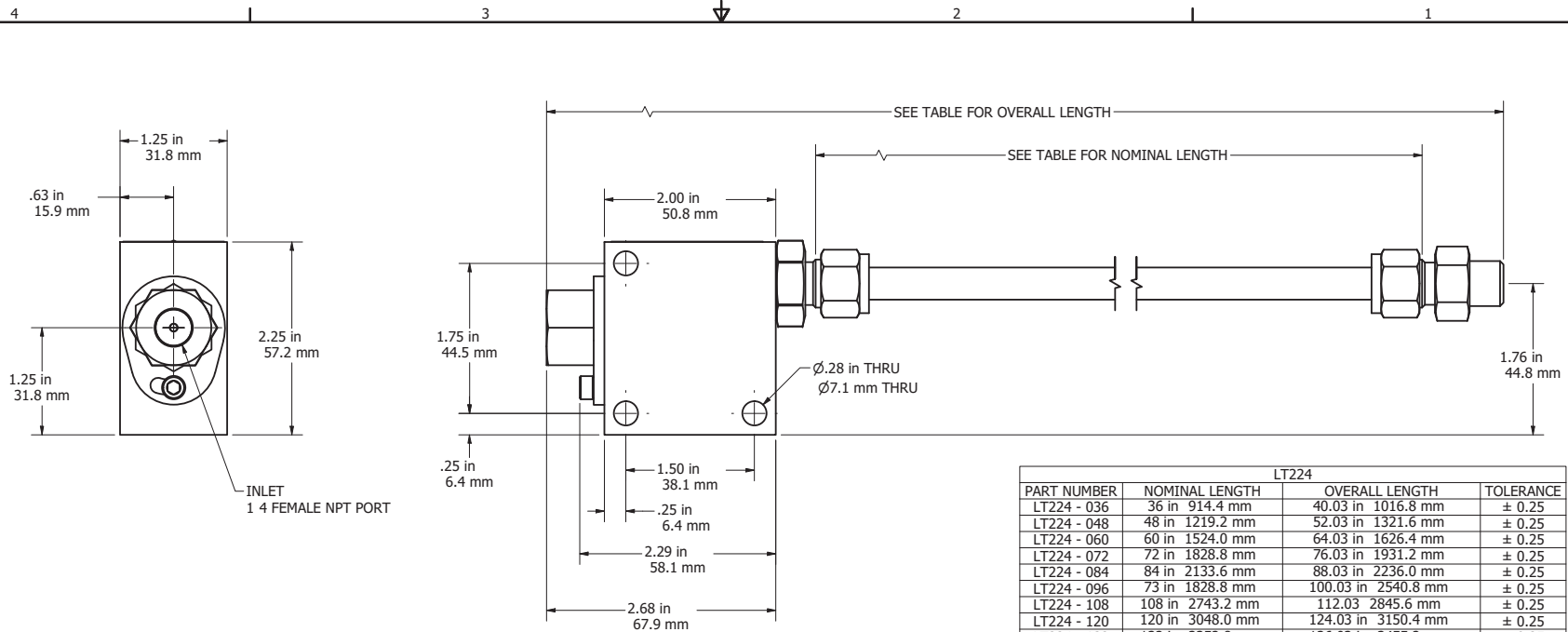
(All tests based on PRD1 Standard):

- Accelerated life test
- Accelerated cyclic corrosion test
- Automotive fluid exposure
- Atmospheric exposure
- Drop and vibration test
- Bench top activation test



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INNOVATIVE THINKING AND PRODUCTS
BULK HAUL, FUEL SYSTEMS, GROUND STORAGE



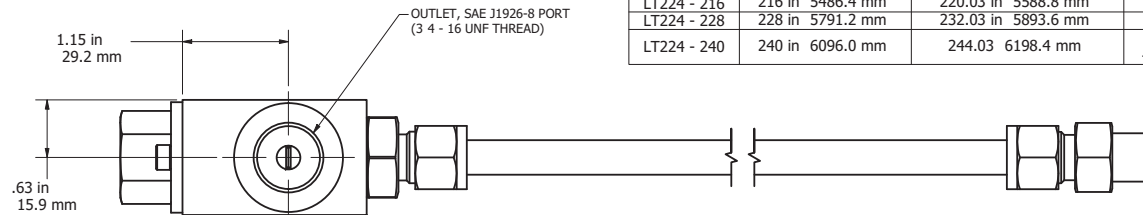
EXTERIOR MATERIALS:
 -6061-T6 ALUMINUM WITH TYPE 2 ANODIC FINISH
 -303, 304 AND 316 STAINLESS STEEL

WETTED MATERIALS, HYDROGEN:
 - 316L STAINLESS STEEL
 - SEALS

INSTALLATION REQUIREMENTS:

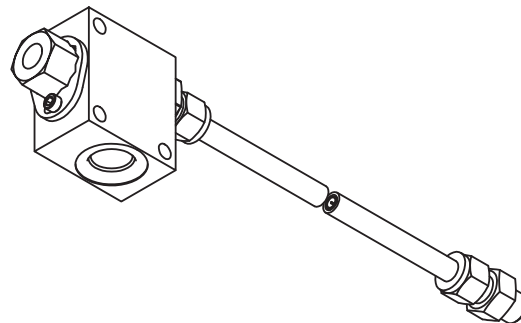
The following are minimum recommended practices for installation of the PRD to meet the functional requirements as tested. It is not a definitive list of mounting and integration considerations. All integration design issues are the responsibility of the entity designing the installation. Refer to Emcara's Component Literature for more information.

1. The PRD body must be secured to the frame using the provided mounting holes in a manner that prevents excessive vibration.
2. Unless otherwise determined and tested, the trigger element (tube) must be fixed to the vehicle
 - every 48" 120 cm or less
 - within 6" 15 cm from the end furthest from the body
 - in a manner that prevents flexing of the tube
 - in a manner that allows for thermal expansion
3. Vent lines connected to the outlet of the PRD must not allow water or debris to enter the PRD or to accumulate in the outlet system.
4. The inlet connections to the PRD should not allow accumulation of condensate in the PRD or lines leading to it.
5. Inlet and outlet connections must allow sufficient flow rate to not adversely affect the rated flow unless this is specifically desired.
6. All parts of the PRD must be shielded from non-fire heat such as exhaust systems.
7. The trigger element must see the same fire conditions as the tank or the system it is protecting.
8. This model is configured for the trigger element to have up to two bends totalling a maximum of 180°.



ESTIMATED PERFORMANCE:

- WORKING GAS: COMPRESSED HYDROGEN
- ACTIVATION TIME: 20-30 SECONDS
- 250L TANK EMPTIED IN UNDER 8 MINUTES (DEPENDING ON SYSTEM CONFIGURATIONS)
- NOMINAL WORKING PRESSURE (BASED ON HPRD1): 700 BAR
- ACTIVATION LENGTH: 18" 450 mm (DEPENDING ON CONFIGURATION)
- ACTIVATION TEMPERATURE: 124 ± 10 °C
- LEAK RATE: 1.0 * 10⁻⁵ SCCS



THIS DRAWING CONTAINS PROPRIETARY INFORMATION AND MAY NOT BE DISCLOSED WITHOUT PRIOR WRITTEN CONSENT.

UNLESS OTHERWISE STATED: ALL DIMENSIONS ARE IN IMPERIAL INCHES TOLERANCE: ONE PLACE DEC. = ±.05 TWO PLACE DEC. = ±.01 THREE PLACE DEC. = ±.005 ANGLE = ± 1°		
MATERIAL:		
FINISH:	SIZE DWG. NO. C LT224	REV NC
DO NOT SCALE DRAWING	SCALE: 1	WEIGHT: SHEET 1 OF 1