

**MT-PML-R7-3P-DMA-90KVA-YJ-LT-DF-A6-BB-CZ-2B4-M1**

**90 KVA Pad Mount Transformer - 34500V Delta Primary - 480Y/277 Wye-N Secondary - Oil Cooled**

**Product ID: 292959**

**Please see last page for supporting documentation for this product(certificates, CAD files & drawings, IES files, wiring diagrams, etc).**



**Larson Electronics LLC manufactures a wide variety of products, including custom built to spec designs. The pictures displayed for this unit are a general representation of form factor for the product line and may not accurately represent this exact configuration in every detail due to custom builds and changes between similar products in our standard catalog. The specifics for this configuration are listed in the specification table and supporting documentation (CAD files, Dimensional Drawing, Name Plate Diagram, Wiring Diagram, etc.). This means that specific details (receptacles, plugs, wires, connections, mounting brackets, external finishes, etc.) may not be accurately represented in images vs specifications. Please review specifications and do not order based solely on images.**

**MT-PML-R7-3P-DMA-90KVA-YJ-LT-DF-A6-BB-CZ-2B4-M1 Pad Mount Transformer**

Transformer Type: Pad Mounted, Compartmental-Type  
Transformer Configuration: Liquid Filled Pad Mounted  
Transformer Feed Type: Loop Feed  
Operation: Step-Down Operation (Not Approved for Step-Up)  
Phase: Three Phase  
Capacity: 90 KVA  
Vector Group: DYN1  
Primary Voltage: 34500V  
Primary Voltage Switch: N/A  
Primary Voltage Class: 35 kV Class  
Primary Phasor: Delta  
Primary BIL: 150 KV  
Secondary Voltage: 480Y/277  
Secondary Voltage Class: 1.2 kV Class  
Secondary Phasor: Wye-N  
Secondary BIL: 30 KV  
Frequency: 60 Hz  
Temperature Rise: 65°C  
Insulation Rating: Class E Insulation - 120°C, 248°F  
Cooling Class: KNAN; Self-Cooled  
Forced Air (Fans): None  
Tap Changer: 5-position Tap Changer  
Tap Qty: (2) FCAN Above Taps, (2) FCBN Below Taps  
Tap %: 2.5%  
Tap Changer Switch Rating: 200-Amp, 35 kV

**Ratings**

Meets/Exceeds DOE 2016 Efficiency Ratings  
Meets/Exceeds CSA Efficiency Ratings  
Complies with ANSI / IEEE C57.12.00  
Complies with ANSI / IEEE C57 12.28  
Complies with ANSI / IEEE C57 12.29  
Complies with ANSI / IEEE C57 12.34  
Complies with ANSI / IEEE C57 12.35  
Complies with ANSI / IEEE C57.12.70  
Complies with ANSI / IEEE C57.12.110  
Complies with ANSI / IEEE C57.12.131  
Complies with ANSI / IEEE C62.11  
Complies with ANSI / IEEE C62.22  
Complies with ANSI / IEEE 386  
Complies with ANSI / IEEE C2  
Complies with ANSI / IEEE C37.47  
Complies with ANSI Z535.4  
Complies with ASTM D3487  
Complies with ASTM D6871  
Complies with NEMA 260-1996  
Complies with 10 CFR Part 431  
Complies with CSA C2.1-06  
Complies with CSA C50  
Complies with CSA C88  
Complies with CSA C88.1  
Complies with CSA C88-16

Tap Changer Switch Location: High Voltage (HV) [Left Side] Front Compartment  
Impedance: 1.2-6.0% Typical, Target 3.10-5.75%  
Primary Connection Type: Dead Front  
Primary Termination Arrangement: V Terminal Arrangement  
Primary Termination: Externally Clamped Integral Bushings w/ Removable Studs, 200A Load Break Elbows  
Primary Connection Qty: (6) Primary Connections for use w/ Elbow Connectors  
Primary Parking Stand Qty: (6) Welded Brackets for Installing Accessory Parking Stand Bushings  
Primary Bushing Rating: 35 kV Class, 150 kV BIL, 200A, Load Break, IEEE 386 Color Off-White  
Primary Neutral Connection: Primary HO Neutral Internally Bonded to Tank  
Primary Surge Arrestors: (3) High Voltage Elbow Surge Arrestors, Included  
Primary Surge Arrestor Voltage Rating: 45 kV Class Elbow Arrestor  
Primary Surge Arrestor MCOV Rating: 36.5 kVrms  
Primary Over Current Protection (OCP): Bayonet Expulsion Fuse in series w/ Partial-Range Current-Limiting Fuse  
Primary Over Current Protection Method: Fused, Oil-Immersed  
Primary Over Current Protection Holder: Bayonet Fuse Holder w/ Flapper Valve and External Drip Shield  
Primary Grounding Provisions: (1) NEMA Ground Bar attached to tank via (2) Welded Ground Bungs in HV Cabinet  
Secondary Connection Type: Live Front  
Secondary Termination Arrangement: Staggered Terminal Arrangement  
Secondary Connections: NEMA Spade Terminals, 4-Hole Spade, Externally Clamped, Accepts up to (4) Double Lug connections with (2) cables per side of Spade connector  
Secondary Connection Qty: (4) Externally Clamped One-Piece Epoxy Bushings Copper Threaded Studs  
Secondary Connection Supports: N/A  
Secondary Over Current Protection (OCP): N/A  
Secondary Neutral Connection: Secondary X2 Neutral Grounded to Tank via 1/2"-13 UNC Tapped Hole, 7/16" Deep Bung & Copper Ground Strap  
Secondary Grounding Provisions: (1) NEMA Ground Bar attached to tank via (2) Welded Ground Bungs in LV Cabinet  
Metering Current Transformer (CT): N/A  
Metering Panel: N/A  
Auxiliary Control Panel : N/A  
Load Break Switch: 4-Position Load Break Switch  
Load Break Switch Qty: (1)  
Load Break Switch Rating: 200-Amp, 35 kV  
Load Break Switch Location: High Voltage (HV) Front Compartment  
Efficiency Standard(s): Meets DOE 2016 Standards, Meets CSA Standards Meets ANSI/IEEE Standards  
K-Factor Rating (Harmonic Mitigation): K-1 (Standard)  
Pulse Drive Rating: N/A  
Insulation Fluid: Biodegradable Natural Vegetable Oil Ester Insulating Fluid - Non-PCB Fluid  
Fluid (Oil) Capacity\*: 91 Gallons  
Fluid (Oil) Weight\*: 710 lb  
Liquid Level Indicator: Analog Dial Gauge  
Temperature Indicator: Analog Dial Gauge  
Pressure/Vacuum Indicator: Analog Dial Gauge  
Pressure Relief Device: Included, Automatic Action  
Fault Indicator: N/A  
Gas Sampler Valve: Included, Schrader Valve  
Fill Valve: 1" NPT Port w/ Removable Bolt Plug  
Fill Valve Location: Front Compartment  
Drain Valve: 1" NPT Port w/ 5/8" NPT Sampler Valve  
Drain Valve Location: Front Compartment  
Winding Material: Copper  
Ambient Temperature Rating: 40°C  
Ambient Operating Temperature Range: -40°C to +40°C (-50°F to +104°F)  
Sound Level: 51 dBA  
Elevation (Altitude): 3300ft (1000 meters) Above Sea Level  
Core Material: Grain Oriented Steel  
Tank Material: Coated Steel  
Cabinet Material: Coated Steel  
Base Platform Material: Coated Steel  
Portability: Lifting lugs, provisions for jacking under base, w/ base construction suitable for using rollers or skidding

Complies with CSA C227.4  
Complies with CSA C227.5  
Complies with CSA C802-3  
Complies with CSA C802.1

#### Features

Pentahead Bolt Entry Assembly  
High-Fire Point Insulating Fluid  
Non-PCB Insulating Fluid  
Tamper Proof Housing  
Hinged Front Compartment Doors, Pad Lockable  
NEMA 3R Wiring Compartment  
Hot Stick Included, HV Door Mount

**Efficiency %: 98.80%**

*Based on transformer operating at 50% of nameplate base kVA.*

**Load Losses Based on 85°C Reference Temp.**

**No Load Loss (in watts): +/- 260W**

**Full Load Loss (in watts) at 100%: +/- 1,300W**

**Total Load Loss (in watts) at 100%: +/- 1,560W**

**Total Losses at 55°C LL Temp.& 20°C NL Temp.**

**Total Load Loss (in watts) at 50%: +/- 562W**

***Note: Losses offered are typical only, not guaranteed***

#### Labeling:

Externally Stencilled (Painted) KVA Rating  
Externally Stencilled (Painted) Voltage Rating  
External Non-PCB Label  
External Warning & Danger Label  
External Barcode Label  
Internal Busing & Accessory Labeling  
Stainless Steel Riveted Nameplate

#### Factory Tests:

Winding Resistance Test  
Insulation Resistance Test  
Voltage Ratio Error Test  
Short-circuit Impedance Test  
No-load Loss (Wattage) Test  
Load Loss (Wattage) Test  
Induced Voltage Withstand Test  
Separate Source Voltage Withstand Test  
Pressure Integrity Test Test

#### Shipping:

Shipped on pallet on open flatbed  
Palletized on Wooden Pallet w/ Skid Pockets  
Pallet Skid Facing Outward Sides of Truck  
***Note: Crated shipping in lieu of palletizing can be done upon request for an additional fee***

Housing Type: Compartmental Air-Filled Cabinet w/ Locking Doors, HV Compartment Left, LV Compartment Right, Steel Barrier Separation, HV Door Spring-Loaded Release Pin in LV Compartment

Enclosure Rating: NEMA 3R Weatherproof Wiring Cabinet, Sealed Tank

Seismic Rating: Yes

Paint Type: Weatherproof and UV Resistant Epoxy Coating and Undercoating

Finish Color: Munsell™ 7.0 GY 3.29/1.5 Bell Green

Mounting: Pad Mounted

Conduit Opening: Bottom Feed Underground Entry/Exit

HV Compartment Base Wireway Dimensions\*: -"-W x -"-D

LV Compartment Base Wireway Dimensions\*: -"-W x -"-D

MV/LV Compartment Cabinet Depth\*: -"-D

Tank Cover Access Handhole: N/A

Dimensions\*: -"-W x -"-D x -"-H

Dry Weight (w/o Oil)\*: - lb

Total Weight (Liquid Filled)\*: - lb

\*Please note that numbers are approximate and subject to change

#### Special Orders - Special Requirements

Contact us for special requirements

Toll Free: 1-800-369-6671

Intl: 1-903-270-1187

Fax: 1-903-498-3364

E-mail: [sales@larsonelectronics.com](mailto:sales@larsonelectronics.com)

**The MT-PML-R7-3P-DMA-90KVA-YJ-LT-DF-A6-BB-CZ-2B4-M1 Industrial Pad Mount Transformer from Larson Electronics offers powerful, reliable and efficient power distribution in indoor, outdoor and public locations. The low operating costs, low heat emissions and low cost of ownership makes this transformer ideal for a wide range of applications and businesses. An enclosed design caters to installations on concrete pads without protective fencing.**

***\*PLEASE NOTE: ANY FREE SHIPPING OFFERS DO NOT APPLY TO POWER DISTRIBUTION PANELS, TRANSFORMERS, OR SUBSTATIONS\****

**Transformer Features:** With a transformer rating of 90 KVA, the industrial transformer features a primary voltage of three-phase 34500V Delta and a secondary voltage of three-phase 480Y/277 Wye-N. The unit has a primary loop feed for daisy chained installations and dead-front primary connections. We also offer systems with radial feed and live front primary connections. This transformer features a 5-position tap changer with two 2.5% taps above and two 2.5% taps below nominal voltage to allow small changes for voltage.

The system features copper windings for high strength and thermal/electrical conductivity. This transformer consists of rectangular coil and five-legged wound core design with three coils and four core loops (this is for three-phase transformers only; single-phase units have one coil and two core loops).

The MT-PML-R7-3P-DMA-90KVA-YJ-LT-DF-A6-BB-CZ-2B4-M1 is air cooled and does not have fans or mounting provision for fans.

**Enclosure Design:** This pad mounted transformer is a compartmental design. The tank and housing are fabricated from steel. The front electrical enclosure carries a NEMA 3R rating. The high voltage and low voltage compartments are located in front of the transformer tank, with the high voltage compartment on the left side and low voltage compartment on the right side. The HV and LV compartments are air filled and separated by a full length steel barrier between the compartments. A removable steel plate at the base of the HV and LV compartments prevents rodents and other intrusions from entering the enclosure once installed. This steel plate allows for underground conduit entry into the enclosure compartments. Two hinged exterior doors allows for access into the compartments. A single pad lockable handle on the low voltage compartment door allows for securing the transformer. A spring loaded pin within the low voltage compartment prevents the high voltage door from being opened without pulling the safety pin. A hot stick is included in the high voltage compartment, mounted to the HV door.

**Temperature Rise:** This unit features 65°C temperature rise for reduced heat waste, increased reliability and longer life. At 65°C temperature rise, the transformer offers 90 KVA. The transformer meets standard efficiency requirements. The combination of low temperature rise and high efficiency makes this unit suitable for use in electrical rooms, air conditioned spaces in buildings, underground vaults and similar locations, in addition to outdoor areas.

**Insulation Fluid:** The MT-PML-R7-3P-GMR-150KVA-YE-LT-DF-A6-BB-CZ-2B4-

M1 features biodegradable cooling fluid (KNAN) with a capacity of 91 gallons. We offer transformers with FR-3 oil fluid, if needed.

**Biodegradable Fluid:** Biodegradable cooling fluid (vegetable oil) has a higher heat capacity compared to mineral oil, making the liquid safer to use and more reliable during operations. Vegetable oil has a higher flash point and fire point than mineral oil, hydrocarbon oil, silicone oil and synthetic ester. This cooling fluid is also non-toxic and can tolerate higher breakdown voltages than mineral oil. When operating at high temperatures, biodegradable cooling liquid sustains up to 120% load conditions, which helps preserve the transformer's lifespan and performance.

**Gauges:** The following gauges are included with the system: liquid level, temperature and pressure/vacuum gauges. Standard liquid level, temperature and pressure/vacuum gauges are analog, manual reading types. These gauges do not have auxiliary contacts.

**Fault Pressure Devices:** This unit is equipped with an automatic fault pressure device. Fault pressure devices are used to detect high rates of pressure rise within the tank.

**Rapid Rise Relay:** There are no rapid rise relays on the unit. This safety component is designed for protection when a rapid increase in tank pressure occurs. The relay is suitable for detecting sudden pressure fluctuations above predetermined safe limits.

**Surge arresters:** This system comes with high elbow surge arresters on the primary side. Designed for over-voltage and transient voltage protection, the components prevent damage caused by lightning, internal switching or voltage surges. We can offer models without high elbow surge arresters that have mounting provisions for customer-provided surge arresters.

**Load Break Switch:** The transformer is equipped with a load break switch on the primary compartment. This switch has four positions: A side on + transformer on, B side on + transformer on, A and B sides + transformer on, and A and B sides + transformer off.

**Valves:** The MT-PML-R7-3P-DMA-90KVA-YJ-LT-DF-A6-BB-CZ-2B4-M1 is equipped with a pressure relief valve, fill valve and drain valve with sampler port.

**Protection Fuses:** This transformer contains bayonet protection fuses on the primary side. For units without protection fuses, up stream protection is provided. We recommend provisions for protection fuses when possible, as blown fuses may require more frequent oil changes.

**Mount:** The heavy-duty enclosure makes the unit suitable for both indoor and outdoor applications. This power distribution system can be pad mounted on concrete pads.

**Benefits:** The MT-PML-R7-3P-DMA-90KVA-YJ-LT-DF-A6-BB-CZ-2B4-M1 pad mount transformer offers many benefits to consumers. This transformer provides owners with significant energy savings, as well as offering environmental benefits. Higher efficiency not only extends the life of the transformer, but also turns into cost savings for owners in the form of lower energy bills and decreased cost of ownership.

**Applications:** General purposes, industrial sites, electrical rooms, underground vaults, manufacturing facilities, steel plants, offshore, commercial, military, processing plants, electric power distribution, utilities, public locations and more. Larson Electronics is a manufacturer and as such can build stationary and portable transformer systems to your specifications. Although we carry several models of power distribution transformer systems, we can deliver custom ordered units almost as quickly as our prebuilt units. If this model does not meet your needs, please contact us at 1-800-369-6671 or [sales@larsonelectronics.com](mailto:sales@larsonelectronics.com) to discuss your specific requirements.

## Frequently Asked Questions (FAQ)

**Q. What type of transformers does Larson Electronics offer?**

A. Larson Electronics offered dry type transformers and liquid filled transformers. For liquid filled transformers, Larson Electronics' offers overhead distribution transformers (utility pole mount), pad mounted distribution transformers (mounts to a concrete pad), pad mounted power transformers, underground submersible distribution transformers, and substation transformers.

**Q. What are the main benefits of a liquid filled transformer?**

A. Liquid filled transformers have higher energy efficiency, durability, short circuit strength, low sound level, lower maintenance costs, and longer useful life expectancy compared to dry type transformers.

**Q. What types of transformer liquids does Larson Electronics use?**

A. Larson Electronics offered mineral oil fluid (ONAN) and biodegradable fluid (KNAN). On request we can provide brand name FR3 fluid or other brand name fluids for additional cost and lead time. All fluids offered by Larson Electronics are non-PCB containing fluids.

**Q. Can this transformer be customized?**

A. Yes, Larson Electronics allows for customization of all transformers. Please send customization requests to sales@larsonelectronics.com. If you have an engineered specification or engineered drawings, please provide those at the time of request.

**Q. What is the warranty of this transformer?**

A. 12 months from point of connecting electrical service to the transformer or 18 months from point of ordering, whichever comes first.

**Q. Where is the detailed dimensional drawing for this unit?**

A. We can provide a feature drawing that shows accessories and estimated form factor. Due to the variety of options and varying voltages, an exact dimensional drawing for the specific unit you have ordered is not available until after purchase and engineering has completed the drawing for your sales order. We do not offer completed detailed engineered drawings before purchase. The feature drawings are detailed enough for concrete pad designs and preliminary engineering site designs.

**Q. Does my primary and secondary voltage matter for a transformer?**

A. Yes, this matters greatly. For primary voltage, most transformers will be equipped with a tap changer for small primary voltage changes due to voltage drop for losses experienced in the transmission line. Some transformers will be equipped with dual voltage primaries with a voltage selector switch to choose which voltage to operate the transformer on. In both cases, these are designed to provide a steady output voltage. It is very important to confirm what voltage your primary voltage being delivered from the utility provider and what the required electrical voltage for the building or house is. You cannot only provide the KVA size, or the abbreviated primary voltage as there is not standardized voltage across the country and each region can be different. Once manufacturing has started, these cannot be changed.

**Q. What is required for mounting this transformer?**

A. For mounting requirements, please see the ASTM Certificate 2 link.

**Q. What types of transformer protection are available?**

A. For over-current protection, Larson Electronics offers Fuses, breakers and interrupters. For over-voltage protection, Larson Electronics offers arresters. Larson Electronics can provide both Primary and Secondary protection equipment.

**Q. Do you have to ground this transformer?**

A. In most cases the enclosure of the transformer is grounded for safety reasons. However, a transformer will function properly without being grounded. Be sure to research all grounding requirements for your specific application against the NETA and NEC as well as any local electrical codes.

**Q. How many BTU's of heat does a transformer generate?**

A. The heat a transformer generates is dependent upon the transformer losses. To determine air conditioning requirements multiply the sum of the full load losses (obtained from factory or test report) of all transformers in the room by 3.41 to obtain the BTUs/hour. For example: A transformer with losses of 2000 watts will generate 6820 BTUs/hour.

**Q. What is the difference between copper and aluminum windings inside the transformer?**

A. Transformers wound with aluminum or copper wire have similar losses and performance. The choice of using copper or aluminum windings depends upon the application and the individual preferences. The type of winding material does not affect the transformer's reliability. A transformer's life is defined by the life of its insulation system.

**Q. What is the difference between Dead Front and Live Front?**

A. Live-front: The voltage-carrying parts are exposed. Live-front terminations have high voltage connectors, arresters, or fuses are exposed to the operator after cabinet has been opened. Dead-front: Often referred to as dead-front bushings. Safety is enhanced as there are no current-carrying parts exposed to the operator. For overhead distribution transformers and underground submersible transformers, live front is common. For pad mount transformers, the primary is typically dead front and the secondary is live front. Protection barriers can be added to live front pad mounted transformers.

**Q. What is the difference between Loop Feed and Radial Feed?**

A. Radial feed Transformers will have three high voltage bushings (H1, H2, and H3). There is one bushing for each phase to allow for the incoming high voltage cables. On Wye and Grounded Wye connected Transformers, there will also be an H0 bushing. Loop feed Transformers will have six high voltage bushings (H1A, H2A, H3A, H1B, H2B, and H3B). There are two bushings for each phase. This allows the customer to connect all of their Transformers in a loop configuration. It will also allow the customer to bring two feeds to the Transformer. A four position switch can be used to switch between the A feed and the B feed.

**Q. What is the lifespan of a transformer?**

A. The average lifespan of a liquid filled transformer is 25 years. Many transformers will survive past the 25 year mark and are still in service for up to 35 years.

**Q. Is this transformer UL Listed? Is this transformer CSA Listed?**

A. By default, no. The majority of medium voltage transformer installations do not require certification by a Nationally Recognized Testing Laboratory (NRTL) unless being installed inside a building. Medium voltage equipment is built to and complies to ANSI, ASTM, DOE, IEEE, and NETA standards. UL is one of multiple NRTLs per OSHA certification for testing facilities for USA standards. CSA is one of multiple NRTLs per Canada certification standards. For an additional fee, we can submit your order for NRTL testing after completion of build. This testing service is per order, requires payment of testing fees,

and will increase lead time.

**Q. What are the transformer ratings?**

**A.** IEEE Std C57.12.20 (Overhead Type), IEEE Std C57.12.34 (Three-Phase Pad-Mounted Compartmental), IEEE Std C57.12.38 (Single-Phase Pad-Mounted), IEEE Std C57.12.36 (Distribution Substation Transformers). For more detailed list of standards, please see the ASTM Certificate 1 link.

**Q. Do Larson Electronics transformers contain PCB?**

**A.** All dry-type and liquid filled transformers manufactured by Larson Electronics are PCB (polychlorinated biphenyl) free at the time of shipment. Mixtures of polychlorinated biphenyls (PCB's) were banned commercially for use as transformers cooling fluids in 1977 due to being toxic, bio-accumulative, not at all biodegradable, and difficult to dispose of safely. None of Larson Electronics transformers contain PCB and only use PCB-free fluids.

**Q. What is the difference between FR3 fluid and biodegradable fluid?**

**A.** Envirotemp FR3 is a brand name of biodegradable ester oils made by Cargill. Cargill is not the only manufacturer of biodegradable ester fluids used for cooling liquid filled transformers. Larson Electronics stocks RAPO biodegradable fluid that exceeds testing for ASTM D6871. Cargill Envirotemp FR3 can be used in substitution of the standard biodegradable fluid. This substitution will increase cost and lead times.

**Q. What is the difference between mineral oil (ONAN) and biodegradable fluid (KNAN)?**

**A.** Mineral oil has a flash point of 147-165°C. Biodegradable insulation fluids have a higher flash point up to 350°C. Using biodegradable fluids reduce the risk of potential fire due to the transformer overheating. Utilizing biodegradable fluids extends the lifespan on the transformer due to better insulation, higher flash point, better moisture resistance, and higher maximum voltage breakdown points over mineral oils.









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**Product ID: 292959**

**Harmonized System (HS) Code: 85043300**

**Export Control Classification Number (ECCN): EAR99**

Links (Click on the below items to view):

- [ANSI Certificate 1](#)
- [ANSI Certificate 2](#)
- [Catalog Page - Product Series](#)
- [FCC Certificate \(Federal Communications Commission, USA\)](#)
- [Internal Component Spec Sheet 3](#)
- [MSDS \(Material Safety Data Sheet](#)
- [Operations Manual](#)
- [HigResPic1](#)
- [HigResPic2](#)
- [HigResPic3](#)
- [HigResPic4](#)
- [HigResPic5](#)
- [HigResPic6](#)
- [HigResPic7](#)
- [HigResPic8](#)
- [HigResPic9](#)
- [HigResPic10](#)
- [Video1](#)
- [ISO 9001 Certification](#)
- [Business Certificate](#)
- [Shipping Time Map](#)