Larson Electronics LLC
9419 E US HWY 175, Kemp, TX 75143
Phone: 800.369.6671

www.LarsonElectronics.com
Email: sales@LarsonElectronics.com
Fax: 903.498.3364

**MT-PSTC-R7-3P-DXK-30MVA-GRJ-HNT-LT-X6-CBFF-CS-2ZZ-M1**

# 30/40/50 MVA Substation Power Transformer, Conservator Type, 138000V Delta Primary, 22900Y/13222 Grounded Wye Secondary - KNAN/KNAF/KNAF, Biodegradable Fluid - Grey - NEMA 4X

**Product ID: 311509**



**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-PSTC-R7-3P-DXK-30MVA-GRJ-HNT-LT-X6-CBFF-CS-2ZZ-M1 Substation Transformer | Ratings |
|---|---|
| **Transformer Type: Substation Power Transformer, Conservator Type** | Meets/Exceeds DOE 2016 Efficiency Ratings |
| **Transformer Configuration: Liquid Filled** | Meets/Exceeds CSA Efficiency Ratings |
| **Transformer Feed Type: Radial Feed** | Complies with ANSI / IEEE C57.12.00 |
| **Operation: Step-Down Operation (Not Approved for Step-Up)** | Complies with ANSI / IEEE C57 12.28 |
| **Phase: Three Phase** | Complies with ANSI / IEEE C57 12.29 |
| **Capacity (w/o Fans, @ 55/65$^{O}$C) 30 MVA (30,000 KVA) / 33.6 MVA (33,600 KVA)** | Complies with ANSI / IEEE C57 12.34 |
| **Capacity (w/ Fans, Stage 1, @ 55/65oC): 40 MVA (40,000 KVA) / 44.8 MVA (44,800 KVA)** | Complies with CSA C88-16 |
| **Capacity (w/ Fans, Stage 2, @ 55/65oC): 50 MVA (50,000 KVA) / 58 MVA (58,000 KVA)** | Complies with CSA C227.4 |
| **Vector Group: Dyn11** | Complies with ANSI / IEEE C57 12.35 |
| **Primary Voltage: 138000V** | Complies with ANSI / IEEE C57.12.70 |
| **Primary Voltage Switch: N/A** | Complies with ANSI / IEEE C57.12.110 |
| **Primary Voltage Class: 145 kV Class** | Complies with ANSI / IEEE C57.12.131 |
| **Primary Phasor: Delta** | Complies with ANSI / IEEE C62.11 |
| **Primary BIL: 650 KV** | Complies with ANSI / IEEE C62.22 |
| **Secondary Voltage: 22900Y/13222** | Complies with ANSI / IEEE 386 |
| **Secondary Voltage Class: 25 kV Class** | Complies with ANSI / IEEE C2 |
| **Secondary Phasor: Grounded Wye** | Complies with ANSI / IEEE C37.47 |
| **Secondary BIL: 150 KV** | Complies with ANSI Z535.4 |
| **Frequency: 60 Hz** | Complies with ASTM D3487 |
| **Temperature Rise: 55/65°C** | Complies with ASTM D6871 |
| **Insulation Rating: Class A Insulation** | Complies with NEMA 260-1996 |
| **Cooling Class: KNAN/KNAF/KNAF** | Complies with 10 CFR Part 431 |
| **Forced Air (Fans): Included, Two-Stages, 115V-1Ph rating, totally Enclosed, Individually Protected Type, Fan Blades Of One-Piece Cast aluminum, Galvanized** | Complies with CSA C2.1-06 |

**Fan Guards. Fan Motors Are Totally Enclosed And Furnished Without Centrifugal Switches.**
**Cooling Radiator: Included, Has Upper And Lower Drain Plugs, ANSI #70 Sky Grey, Contains Individual Shut-Off Valves, Panel Type**
**HV Tap Changer:** 5-Position No-Load Tap Changer (NLTC), all stationary and movable contacts are silver plated and non-coking
**HV Tap Qty:** (2) FCAN Above Taps, (2) FCBN Below Taps
**HV Tap %:** 2.5%
**HV Tap Changer Switch Rating:** 145 kV
**HV Tap Changer Switch Location:** H.V Side, on the tank wall lower than eye level
**LV Tap Changer: 33-Position On-Load Tap Changer (OLTC)**
**LV Tap Qty: (16) FCAN Above Taps, (16) FCBN Below Taps**
**LV Tap %: 5/8%**
**LV Tap Changer Switch Rating: 145 KV**
**LV Tap Changer Switch Location: L.V Side, Side Mounted In a Separate biodegradable fluid filled Compartment equipped with the following:**
**1:** Liquid Level Gauge W/ two Alarm Contacts And An additional Form “C” Contact For Low Level Rated At 20 Amps 125 VAC For Sump Basin Water Pump
**2:** One thermostatically controlled heater to prevent condensation in the LTC control cabinet
**3:** Flanged 1-inch brass ball drain valve with a sampling port at the bottom of the compartment. The valve has 1-inch NPT threaded pipe plug on the open end.
**4: Filling Plug (located at the top of the compartment)**
**5: A Lip To Prevent Oil Spills After Draining The Compartment**
**6: A drive mechanism with: drive motor (shall be easily accessible and not immersed in oil), Local position indicator, Operation counter (easily readable from ground level and located in the LTC motor cabinet)**
**7: Rehydrating desiccant breather**
**8: One light fixture, 100 W equivalent, mechanically protected operated by control cabinet door in the LTC control cabinet**
**9: One 120 VAC 20A, GFI receptacle in the LTC control cabinet**
**10: Electronic tap position transducer to provide remote indication of the tap position consists of (Incon syncro transmitter Model #1292-KS & Incon receiver and output display Model #1250 to be mounted in the control cabinet)**
**11: Electrically interlocked hand crank for manual operation of the LTC**
**Impedance (@ 30 MVA): 11.5%**
**Primary Connection Type: Live Front**
**Primary Termination Arrangement: Inline, Top Mounted In ATC**
**Primary Termination: NEMA 4-Hole Pad connectors**
**Primary Bushing Qty: (3)**
**Primary Bushing Rating: 145 KV Class, 650 KV BIL, Porcelain, ANSI #61 Grey, Includes Visible Oil Level Indicator "Sight Glass", Oil-Filled Condenser Type**
**Primary Neutral Connection: N/A**
**Primary Surge Arrestors: Included, (3) Metal Oxide Polymer Housed Station Class, ANSI #61 Grey, Connected to stainless steel ground pad at the base of the transformer**
**Primary Surge Arrestor Voltage Rating: 144 KV**
**Primary Surge Arrestor MCOV Rating: 115 KV rms**
**Primary Bushing CT: Included, (1) Per Each Phase (1200:5 MR C800 Relaying Accuracy Class) & (1) Per Each Phase (2000:5 MR C800 Relaying Accuracy Class)**
**Primary Over Current Protection (OCP):** N/A
**Primary Over Current Protection Holder: N/A**
**Primary Grounding Provisions: N/A**
**Secondary Connection Type: Live Front**
**Secondary Termination Arrangement: Inline, Top Mounted**
**Secondary Termination: NEMA 4-Hole Pad connectors**
**Secondary Bushing Qty: (4)**
**Secondary Bushing Rating: 35 KV Class, 150 KV BIL, Porcelain, ANSI #61 Grey, Includes Visible Oil Level Indicator "Sight Glass", Oil-Filled Condenser Type**
**Secondary Neutral Connection: 35 KV Class, 150 KV BIL, Porcelain, ANSI #61 Grey, Includes Visible Oil Level Indicator "Sight Glass", Oil-Filled Condenser Type**
**Secondary Over Current Protection (OCP): N/A**
**Secondary Bushing CT: Included, (1) Per Each Phase (2000:5 MR C400 Relaying Accuracy Class)**
**Secondary Bushing PT:** Included
**Secondary Surge Arrestors: Included, (3) Metal Oxide Polymer Housed Station Class, ANSI #70 Sky Grey, Connected to stainless steel ground pad at the base of the transformer**
**Secondary Surge Arrestor Voltage Rating: 24 KV**
**Secondary Surge Arrestor MCOV Rating: 19.5 KV**
**Secondary Grounding Provisions: Included, (2) Grounding Pads Located On Diagonally Opposite Corners Of The Tank Base For Grounding Of The Transformer**

Complies With IEEE Std 693-2018

Complies with CSA C50

Complies with CSA C88
Complies with CSA C88.1
Complies with CSA C227.5
Complies with CSA C802-3
Complies with CSA C802.1

**Features**

Penta-head Bolt Entry Assembly

Non-PCB Insulating Fluid

Tamper Proof Housing
Hinged Front Compartment Doors, Pad Lockable

Hot Stick Included, HV Door Mount

NEMA 4X Wiring Compartment

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

**Load Losses Based on 75°C Reference Temp.**

**Off-Load Loss (in watts): 21800W, ±10% Tolerance**
**On-Load Loss (in watts): 120890W, ±10% Tolerance**
**Total Load Loss (in watts) at 100%: TBD**

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

**Total Load Loss (in watts) at 50%: TBD**

**With Bolt Type Connectors For Connection To 2/0 to 500 KCMIL Stranded Copper conductor**
**Secondary Neutral Bushing CT: Included, (1) (1200:5 MR C400 Relaying Accuracy Class)**
**Metering Current Transformer (CT): Included**
**Metering Panel: N/A**
**Auxiliary Control Panel : Included, Contains Power Sources 125 Vdc, 120/240 Vac-1Ph**
**Load Break Switch: N/A**
**Load Break Switch Qty: N/A**
**Load Break Switch Rating: N/A**
**Load Break Switch Location: N/A**
**Efficiency Standard(s): Meets ANSI/IEEE Standards**
**K-Factor Rating (Harmonic Mitigation): K-1 (Standard)**
**Current Total Harmonic Distortion: 5.0%**
**Insulation Fluid: Biodegradable Natural Vegetable Oil Easter Insulating Fluid, Non-PCB Fluid**
**Fluid (Oil) Capacity*: TBD**
**Fluid (Oil) Weight*: TBD**
**Silica Gel Breather: Included**
**Liquid Level Indicator: Included, Magnetic Type, Pyromation Base P/N JJ68G-010-SP-19HT-F1A036-0 (Z371)**
**Winding Temperature Indicator: Included Thermometer, Messko, Type: MT-ST/60 VMR/4C/4M**
**Liquid Temperature Indicator: Included, Three-Stage Type, with minor alarm and major alarm contacts, (form "C" alarm contacts)**
**Pressure/Vacuum Indicator: Included, With Scale Range Of Plus Or Minus 10 PSI**
**Rapid Rise Relay: Included, Qualitrol 910-013-03**
**Pressure Relief Device: Included, (2) cover-mounted extra-large mechanical type, (Qualitrol XPRD), mounted on diagonally opposite ends of the transformer cover, With automatic resealing operation, With 2-form "C" and 2-form "A" alarm contacts. "A" contact to I/O module. Other form "C" to terminal board 3, Includes mechanical signal for indication of device operation, Includes directional discharge outlet and applicable piping to direct discharge to a location approximately 1-foot above base of transformer, Includes screen at pipe exit to prevent animal ingress.**
**Transformer Monitor And I/O Processor: Included, Schweitzer SEL-2414 Transformer Monitor (P/N: 241421ABA913A3A0131), An SEL-2725S Ethernet Switch installed to network the SEL-2411 I/O Controller, SEL-2414 Transformer Monitor, SEL-2411 Load Tap Changer Controller**
**Nitrogen Oil Preservation System: Included With A Nitrogen Tank And All Necessary Accessories**
**Tank Inert Gas Pressure Electronic Monitoring:** Included, w/ Anderson Greenwood H1RDS-4R10
**Inert Gas System Bottle Pressure Electronic Monitoring:** Included, w/ Anderson Greenwood H1RDS-4R10
**Pressure Reducer: Included, Three-Stage**
**Gas Relay: Included**
**Fault Indicator: Included, Buchholz Relay**
**Gas Sampler Valve: N/A**
**Fill Valve: Included**
**Fill Valve Location: Top Mounted**
**Drain Valve: Included, 2" Globe Type With 3/8" Sampling Valve**
**Drain Valve Location: -**
**Winding Material: Copper**
**Ambient Temperature Rating: 40°C**
**Ambient Operating Temperature Range: -40°C to +40°C**
**Sound Level: N/A**
**Elevation (Altitude): 3300ft (1000 meters) Above Sea Level**
**Core Material: Silicon Steel, Grain Oriented**
**Tank Material: 304 Stainless Steel**
**Cabinet Material: 304 Stainless Steel**
**Base Platform Material: 304 Stainless Steel**
**Hardware Material: Stainless Steel**
**Portability: Lifting lugs, provisions for jacking under base, w/ base construction suitable for using rollers or skidding**
**Housing Type: Metal Casing Liquid Filled Transformer**
**Enclosure Rating: NEMA 4X Weatherproof**
**Seismic Rating: Zone 1**
**Paint Type: Weatherproof and UV Resistant Epoxy Coating and Undercoating**
**Finish Color: ANSI #61 Grey**
**Mounting: Pad Mounted**
**Cables:** N/A

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

**Labeling:**

Externally Stenciled (Painted) KVA Rating
Externally Stenciled (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
Pressure Integrity Test
Insulation Resistance Test
Voltage Ratio Error Test
Separate Source Voltage Withstand Test
Short-circuit Impedance Test
Load Loss (Wattage) Test
No-load Loss (Wattage) Test
Induced Voltage Withstand 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***

**Conduit Opening: N/A**
**Tank Cover Access Handhole: Included**
**Dimensions: TBD**
**Dry Weight (w/o Oil)*: TBD**
**Total Weight (Liquid Filled)*: TBD**
*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**

**The MT-PSTC-R7-3P-DXK-30MVA-GRJ-HNT-LT-X6-CBFF-CS-2ZZ-M1 Conservator Substation Transformer from Larson Electronics offers powerful, reliable, and efficient power distribution in outdoor 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. This transformer ensures extra space for storing oil and is equipped with breathers to facilitate air flow. The conservator transformer should be installed on supporting structures.**
***PLEASE NOTE: ANY FREE SHIPPING OFFERS DO NOT APPLY TO POWER DISTRIBUTION PANELS, TRANSFORMERS, OR SUBSTATIONS****
**Transformer Features:** The industrial transformer features a primary voltage of three-phase 138000V Delta and a secondary voltage of three-phase 22900Y/3222 Grounded Wye. This system is rated for 30 MVA (30,000 KVA) natural cooled, 40 MVA (40,000 KVA) first stage fan cooled and 50 MVA (50,000 KVA) second stage fan cooled. We offer systems with loop or radial feed, as well as dead front or live front primary connections. The transformer features a 33-position ON-load tap changer with sixteen, +/- 5/8% taps above and sixteen, +/- 5/8% taps below to allow small changes for voltage. There is a rapid rise relay present on the system. 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-PSTC-R7-3P-DXK-30MVA-GRJ-HNT-LT-X6-CBFF-CS-2ZZ-M1 has fans for forced air cooling. This non-sealed system features breathers for cooling when operating temperatures increase.
**Temperature Rise:** This unit features 55/65°C temperature rise for reduced heat waste, increased reliability and longer life. At 55°C temperature rise, the transformer offers 30 MVA (30,000 KVA) natural cooled, 40 MVA (40,000 KVA) first stage fan cooled and 50 MVA (50,000 KVA) second stage fan cooled. At 65°C temperature rise, the transformer offers 33.6 MVA (33,600 KVA) natural cooled, 44.8 MVA (44,800 KVA) first stage fan cooled and 58 MVA (58,000 KVA) second stage fan cooled. The transformer meets standard efficiency requirements. The combination of low temperature rise and high efficiency makes this unit suitable for use in outdoor areas.
**Insulation Fluid:** The MT-PSTC-R7-3P-DXK-30MVA-GRJ-HNT-LT-X6-CBFF-CS-2ZZ-M1 features Biodegradable Insulation fluid (KNAN/KNAF/KNAF). We offer transformers with FR-3 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 indicator, Fluid temperature indicator, Winding Temperature Indicator, pressure/vacuum indicator. Standard liquid level, temperature and pressure/vacuum gauges are analog dial types.
**Fault Pressure Devices:** There is a Rapid Pressure Rise Relay and Seal-In Relay on this unit.
**Gas Relay:** A gas relay with indicators for light gas and heavy gas is included with

the transformer. The relay includes two Dry Type Form C auxiliary contacts (1NO + 1NC) for remote alarm when pressure rises above in-field set pressure located in auxiliary control cabinet.
**Surge arresters:** This system comes with surge arresters on both the primary and secondary sides.
**Load Break Switch:** The transformer is not equipped with a load break switch.
**Valves:** The MT-PSTC-R7-3P-DXK-30MVA-GRJ-HNT-LT-X6-CBFF-CS-2ZZ-M1 is equipped with a pressure relief valve.
**Protection Fuses:** This transformer does not have 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:** This conservator substation transformer is installed on supporting structures, such as the roof of the transformer main tank.
**Benefits:** The MT-PSTC-R7-3P-DXK-30MVA-GRJ-HNT-LT-X6-CBFF-CS-2ZZ-M1 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 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 to discuss your specific requirements.

# Frequently Asked Questions (FAQ)