

Mutual Drainage Reactor Assembly 751201 and 751300

Description and Installation



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Should a problem arise, contact your customer support department. If the problem cannot be resolved by your support department or if you have any questions, contact Positron's Technical Customer Support department at 1-888-577-5254.

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1. The Mutual Drainage Reactor Assembly

The Mutual Drainage Reactor Assembly is intended to replace the standalone drainage reactor used primarily in the Central Office (CO) of a telephone company. The Mutual Drainage Reactor Assembly is comprised of a module (model 751300) and a shelf (model 751201). For a view of the Mutual Drainage Reactor Assembly, refer to Figure 1.

As a modular, plug-in arrangement, this system offers a neat and organized installation in a CO.

The Mutual Drainage Reactor module, model 751300, is designed to protect communications equipment against the high voltages which may be induced onto telephone pairs, within a telecommunication cable, during power fault conditions.

The Mutual Drainage Reactor shelf, model 751201, is a 23"x 5-1/4", baymount shelf which accommodates up to eight plug-in Mutual Drainage Reactor modules. The shelf is equipped with a smoked Lexan non-hinged door for aesthetics.

The Mutual Drainage Reactor Assembly provides a direct drainage path to ground for common mode induced voltages while maintaining a high impedance to AC differential telephone signals (typically 60 to 4000 Hz). The result is safe, uninterruptible communication before, during, and after fault conditions. It is ideally used on class "A" circuits.

The module features include the following:

- When the module is connected across a telephone pair with its center tap grounded, it presents a high impedance to differential (metallic) AC signals on the line while presenting a low impedance to ground for common mode (longitudinal) noise.
- The center tap may be grounded either directly or through a three element gas tube, depending on the application.

2 Mutual Drainage Reactor Assembly

- The module's two coils are wound on a single core, and are fully interleaved. Each coil consists of two windings, with the inner winding of one connected to the outer winding of the other to form one half of the mutual drainage reactor. This form of coil construction ensures good transient response, even to lightning induced surges on the line.
- High drainage capability without signal distortion is achieved by ensuring that the separate coils are perfectly balanced and tightly coupled, and are of sufficient impedance to give satisfactory longitudinal balance and insertion loss figures at audio frequencies.
- The module is encased in a plastic mold and is mounted on a plug-in module. Up to eight modules can be inserted in the 23-inch rack shelf to service eight different telephone pairs. Two terminal blocks at the rear of the shelf access the Tip and Ring terminals of each card.

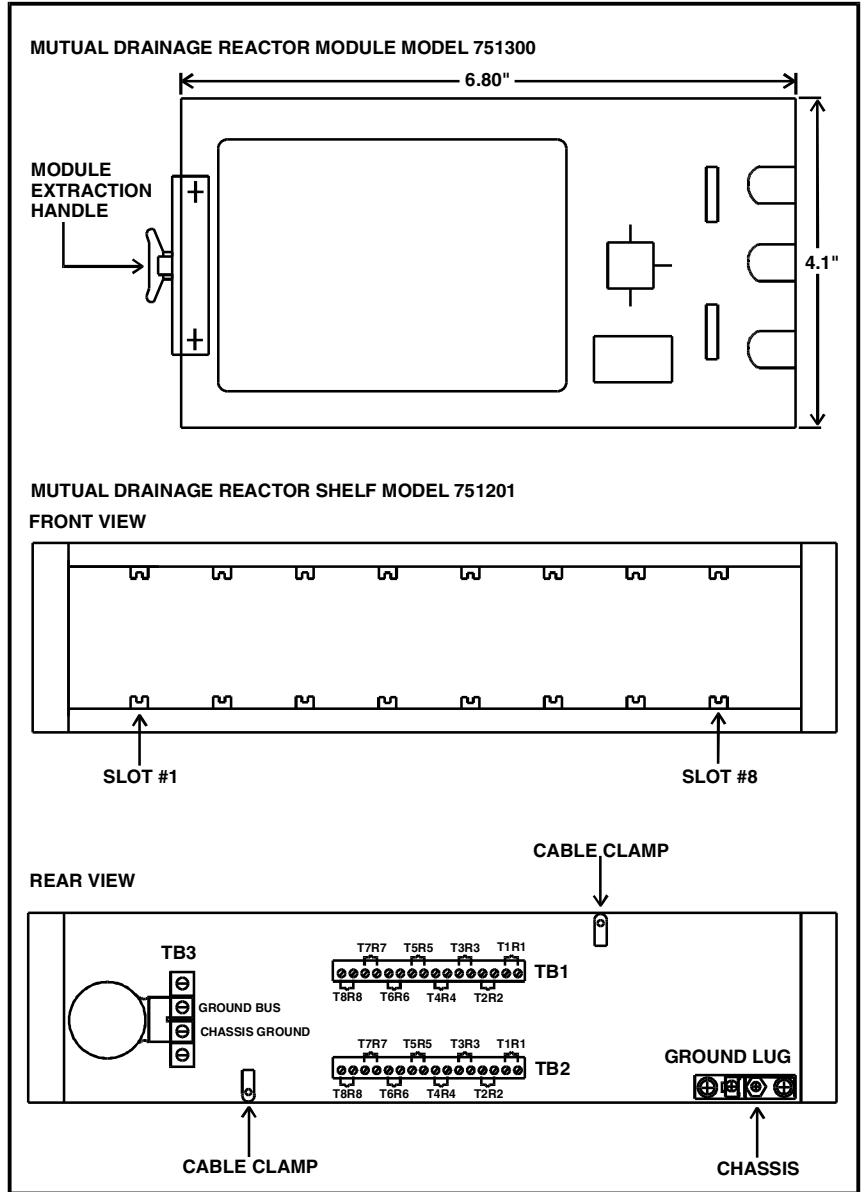
Note

- The module incorporates a gas tube rated at 300 V in series with the module that can be bypassed using two jumper wires: W1 and W2. The units are shipped with the jumpers installed.
- Applications where the Tip and Ring are floating will have the jumpers removed, therefore, practically disconnecting the module. When a fault occurs, common mode voltages in excess of 300 V will appear across Tip and Ring to ground, thereby firing the gas tube, which will connect the module and reduce the common mode.

Caution

The module (with the gas tube bypassed) must not be used where simplex or loop sealing currents are present. Loop sealing would saturate the transformer and simplex sealing would be short-circuited to ground.

Figure 1 Model 751201 and 751300



2. Shelf Mechanical Assembly

The following is a description of the Mutual Drainage Reactor shelf assembly.

Connectors/Motherboard

The Mutual Drainage Reactor modules plug into Connectors mounted on a Motherboard affixed to the rear of the shelf.

Terminal Blocks

Two Terminal Blocks (TB1, TB2) are mounted at the rear of the shelf on the motherboard for connections to Tip and Ring.

A third, heavy gauge, Terminal Block (TB3) is mounted on the rear of the shelf on the motherboard for connection to the ground bus and chassis ground. A removable jumper is mounted on TB3, which interconnects the ground bus to chassis ground. For the locations of TB1, TB2 and TB3, refer to Figure 1.

Always leave the jumper connected. Removing it would disconnect the module from ground, thereby defeating the whole purpose of the Mutual Drainage Reactor Assembly.

Chassis Ground Lug

A heavy gauge Chassis Ground Lug is also mounted on the rear of the shelf to provide for connection to the CO ground bus. It is internally connected to the chassis ground terminal on TB3.

Cable Clamps

Cable Clamps are installed near TB1 and TB2, and are to be used to secure the incoming and outgoing lines to the shelf.

3. Technical Specifications

For a listing of the module's electrical specifications, refer to Table 1. For a listing its physical specifications, refer to Table 2.

Table 1 Electrical Specifications (measured at 77°F or 25°C, 50% R.H.)

Parameter	Specifications
Drainage capacity	0.5 A rms continuous
Short time drainage capacity (I^2T)	400 A ² -S (2.0A x 100 sec)
Winding resistance	2 Ω each winding
Winding resistance unbalance	3% maximum
Inductive unbalance	1% maximum
Bridging impedance (@ 20V, 60 Hz)	25 kΩ minimum *
Bridging loss	0.1 dB max. from 60 Hz to 4 kHz
Longitudinal balance	Better than 80 dB per ANSI/IEEE Std. 455-1985
Insulation between windings	2 kV DC/3 sec; 5 kV BIL (1.2 x 50) μsec test wave
Insulation between windings and exterior of encapsulated module	2 kV for 3 sec; 5 kV BIL (1.2 x 50) μsec test wave
Transient response	75% of applied voltage across one half should be generated across the other half with 5 μsec; BIL (1.2 x 50) μsec test wave
* This minimum bridging impedance measurement of 25kΩ is less than the standard specified minimum of 50kΩ, however, the module should only be used on AC type services. In most instances the total loop resistance of an AC type service will be much lower than the 25 kΩ bridging impedance.	

Note

The module cannot be used on circuits operating above 20 Vrms. If circuits operating above 20 Vrms are used, the transformer would become saturated and the module will no longer conform to its specifications. The module is to be used on AC type, class “A” service, which allows a line to remain operational before, during, and following a fault.

Table 2 Physical Specifications

Parameter	Specifications
Operating temperature range	+32°F to +122°F (0°C to + 50°C)
Plug-in module height	4.1" (10.414 cm)
Plug-in module width	2.0" (5.08 cm)
Plug-in module depth	6.8" (17.272 cm)
Plug-in module weight	2 lbs (0.908 kg)
Shelf height	5.22" (13.26 cm), standard (rack mount)
Shelf width	23" (58.42 cm)
Shelf depth	9-1/4" (23.5 cm)
Shelf weight	4.59 lbs (2.84 kg)

4. Installation

The Mutual Drainage Reactor Assembly will usually be installed at the CO. This eliminates common mode 60 Hz or transients from the line.

When installing the Mutual Drainage Reactor Assembly, refer to Figure 1 and Figure 2.

Caution

Stand on a thick rubber mat and wear rubber gloves during the installation procedure. It is preferable to perform these procedures on a clear dry day when a Ground Potential Rise (GPR) or transients are less likely to occur.

1. Unpack the Mutual Drainage Reactor Assembly and its installation hardware from its protective box.
2. Install the Mutual Drainage Reactor shelf on a 23" rack.
3. Connect the chassis ground lug to CO (local) ground.
4. Connect the incoming (remote) Tip and Ring lines to their respective Tip and Ring terminals on TB2. For a listing of the terminal block connections, refer to Table 3.
5. Connect the outgoing (CO) Tip and Ring lines to their respective Tip and Ring terminals on TB1.
6. Insert the Mutual Drainage Reactor modules into appropriate slots.
7. Using cable clamps, secure the incoming and outgoing cables to the shelf.
8. Verify the installation by checking that communications can be established in a normal manner.

Figure 2 Installation Schematic Diagram

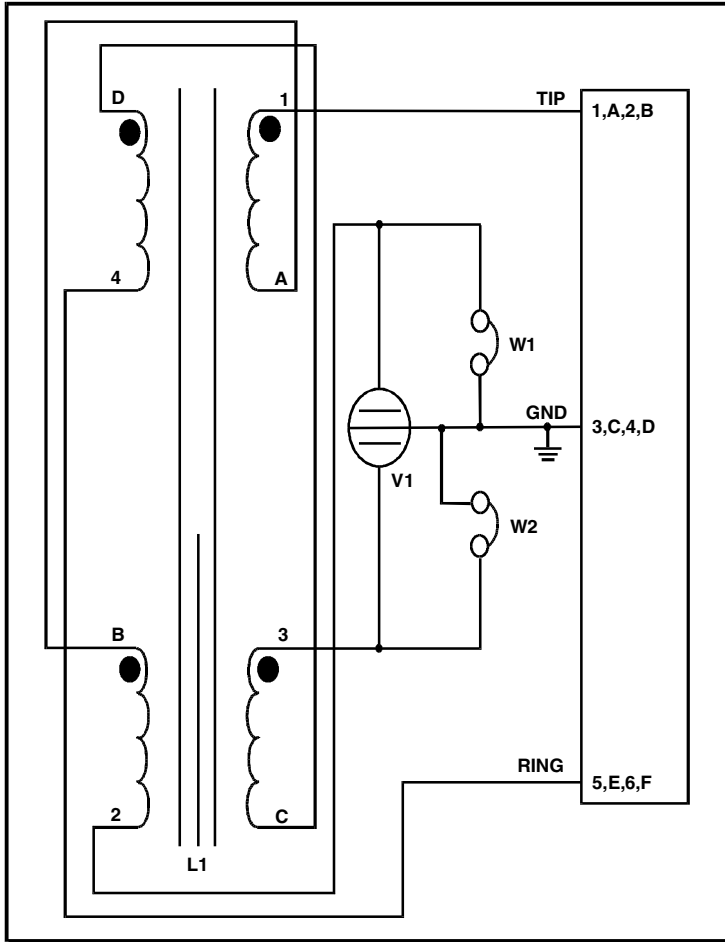


Table 3 Terminal Block Connections

Pair	Signal	TB1	TB2	Module Slot Number
1	Tip Ring	T1 R1	T1 R1	1
2	Tip Ring	T2 R2	T2 R2	2
3	Tip Ring	T3 R3	T3 R3	3
4	Tip Ring	T4 R4	T4 R4	4
5	Tip Ring	T5 R5	T5 R5	5
6	Tip Ring	T6 R6	T6 R6	6
7	Tip Ring	T7 R7	T7 R7	7
8	Tip Ring	T8 R8	T8 R8	8

5. Service and Support

Technical Customer Support

Positron is committed to providing excellent ongoing technical support to its customers. A team of specialists is always available at our Technical Support Center in Montreal for either telephone consultations or on-site visits, to assist Field Technical personnel in the maintenance and troubleshooting of Positron equipment. During normal business hours, (8:30 a.m to 5:00 p.m. EST), any one of our Technical Customer Support (TCS) staff may be reached by dialing 1-888-577-5254 from anywhere in the continental United States or from Canada. Customers outside North America should dial 1-514-345-2200. Staff may also be contacted via fax at 514-345-2271 or e-mail at powerdivision@positron.qc.ca.

Positron TCS staff are available to provide technical assistance and/or to supervise the installation of Positron equipment. Assistance in the planning, configuration, and implementation of the installation will be provided as requested. Arrangements and pricing information regarding field assistance may be obtained by contacting the Technical Customer Support department. Please contact Positron for scheduling at least four weeks prior to the actual requested visit date.

Customer Training

Positron offers full customer training courses, as requested. Seminars are also available on High Voltage Interface (HVI). For more information, contact a customer representative by dialing 1-888-577-5254 or use our e-mail address, powerdivision@positron.qc.ca.

Warranty

Positron warrants that all equipment shall perform in accordance with Positron's specifications. The warranty remains valid for five (5) years from the date of shipment. The warranty will be honored provided that the equipment has not been abused and provided that the equipment has been installed and used in accordance with Positron's installation instructions and specifications. The warranty fully covers workmanship, materials and labor.

This warranty is in lieu of all other warranties, whether expressed or implied, including warranties of merchantability and fitness for a particular purpose. Positron guarantees that all equipment shall perform in accordance with Positron's specifications. Positron disclaims any warranty that Positron

equipment will meet customer requirements beyond the product specification. Positron disclaims any warranty that operations will be uninterrupted or error free.

Repair Service

Positron Inc. offers repair services by which customers can count on timely and quality repairs, regardless of customer location.

All warranty repairs are performed at no cost. Positron reserves the right to repair or replace any equipment which has been found to be defective.

For information about out-of-warranty repairs, contact Positron's Repair department at 1-800-661-4911 (from anywhere in the continental United States or from Canada) or dial 514-345-2228. Due to the varied nature of repairs, no one time frame for turnaround can be guaranteed. However, average turnaround time is two weeks from date of receipt. In emergency situations, special arrangements can be made by contacting our Repair department. All repaired items are warranted for a period of 90 days. Bulk repairs (more than five items) will require additional processing time, therefore, please take this into consideration when requesting a Return Material Authorization (RMA) number.

Before returning any items to Positron for repair, warranty repair or replacement, call the Repair department to obtain an RMA number. Parts returned without RMA numbers cannot be accepted. The RMA number must always be clearly marked on all boxes and crates and on all shipping documents.

Items under warranty are to be shipped prepaid to Positron and will be returned prepaid to the customer. Items that are not under warranty are to be shipped prepaid to Positron and will be returned prepaid with freight charges included on the invoice. Positron cannot accept items shipped collect. A purchase order number is required for all repairs.

To accelerate the repair process, whenever possible, customers should include a report detailing the reason for return with the unit(s) being returned. Also, please include the name and phone number of a person who can be contacted should our Repair department need further information.

When packing items being returned for repair, please ensure that the item(s) is properly packed to avoid further damage. Teleline Isolator cards should never be shipped while installed in a shelf; this will cause damage and will almost invariably extend the repair period.

Ordering Information

Positron's Teleline equipment can be ordered by telephone, facsimile, or by mail. All orders should be directed to the Positron Inside Sales department. Ordering by telephone, or facsimile will eliminate any delays arising from postal services. However, a hard copy purchase order is required as a confirmation. In addition to the model numbers of the items being ordered, the following information is required:

- Company name, contact name and telephone number
- Purchase order number
- "Ship To" address
- "Bill To" address
- Date required on site

All orders must be followed by a confirming order. Equipment will not be shipped until such confirmation is received.

For a list of our contact information, refer to Table 4.

Table 4 Positron Contact Information

Address	Positron Inc.
	5101 Buchan St.
	Montreal, Quebec, Canada
	H4P 2R9
Main telephone number	514-345-2200
Customer Service department telephone number	514-345-2200, 1-888-577-5254
General e-mail address	powerdivision@positron.qc.ca
Customer Service department fax number	514-345-2271
TCS department toll-free number	1-888-577-5254
TCS department fax number	514-345-2271
TCS department e-mail address	scarbonaro@positron.qc.ca
Repair department telephone numbers	514-345-2228 or 1-800-661-4911
Customer representative e-mail address	customerservicepower@positron.qc.ca

