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DEMA LTR-400 Lockout Relay Quick Guide

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INTRODUCTION

DEMA proudly presents the users and modern networks a solid alternative for lockout duties with LTR-400; with the state-of-art physical and functional technology for use in LV, MV or HV facilities; and provides the users numerous assembly, commissioning, operating and servicing advantages as well as the lowest total cost of ownership.

DEMA LTR-400 is the enhanced sequel to DEMA LTR010 model, featuring several electrical, mechanical and dimensional improvements, and have been presented to service under the guarantee of ISO9001:2000 Quality Assurance System.

The general specifications of LTR-400 are listed below to create a common sense for the product.

- Safe mechanical lockout mechanism with mechanical resetting to ensure secure locking and unlocking of circuit breaker reclose,
- 4 SPDT (single-pole / double-throw) auxiliary contacts,
- Mechanical indicator operating independently from the supply continuity,
- Operation without removing cover, thanks to IP52 button integrated on the cover,
- Precision manufacturing,
- Draw-out system that enables rapid unit replacement,
- Unbreakable protective earth circuit continuity,
- New generation casing with IP52 front side protection, IP20 rear side protection,
- Expert technical crew and matchless customer support.

TECHNICAL DESCRIPTION

LTR-400 – General Specifications

Insulation Class	2 kV / 50 Hz / 1 min
Operating Temperature	-5°C to +40°C
Storage Temperature	-5°C to +70°C
Max. Storage Duration	3 years indoors in original box.

LTR-400 – Output Features

Output Contacts	4 SPDT (change-over) contacts.
Opening Time for Normally Closed Contacts	8 ms
Closing Time for Normally Open Contacts	13 ms

LTR-400 Contact Characteristics

Current carrying capacity	10 A _{rms}
Max. switching current	10 A _{rms}
Max. switching voltage	250 V _{AC}
Max. switching current at: 110 V _{AC} , cosφ = 0.4 inductive.	10 A _{rms} on each pole.
Max. switching current at: 110 V _{AC} , cosφ = 1.0 resistive.	10 A _{rms} on each pole.

LTR-400 - Power Features

Supply Voltage	110 V _{AC}
Operational Supply Voltage Range	+%10 U _{r-aux} / -%20 U _{r-aux}
Standby Power Consumption	No consumption.
Maximum Power Consumption, excl. external devices.	12.7 VA .

LTR-400 - Physical Properties

Case Type	DRC 96 – S2
Degree of Protection for Front Side	IP 52
Degree of Protection for Rear Side & Terminals	IP 20
Mounting	Flush
Main Unit	Withdrawable

PACKING AND LABELING INFORMATION

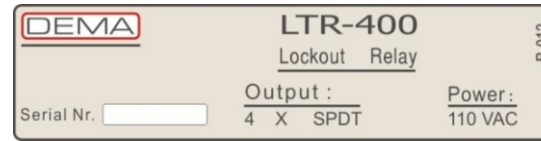
Package Information

- Gross Weight: 2.30 kg
Contents: Please check the following items upon arrival:
- LTR-400 Lockout Relay, 1 piece.
 - Connecting Elements Set, 4 x (custom screws, nuts and washers).
 - LTR-400 Lockout Relay Quick Guide (this document).

Unit Label Information

Unit label is shown at the picture below, and gives the following information:

Producer Logo	DEMA
Product Name	LTR-400
Product Description	Lockout Relay
Product Serial Number	L.123456
Outputs	4 x SPDT
Auxiliary Power Supply	110 VAC <input type="checkbox"/>



MOUNTING LTR-400

Flush mounting requires processing of the panel – the cut-out drawing needed for this can be found on this document. The dimensions on the drawing are determined taking standard electrostatic coating thickness into consideration, therefore, can be directly applied to bare metal sheet.

Mounting of the relay case on the prepared panel is done as described below.

1. Open the relay cover, preferably drive out the internal unit for easier mounting. If the internal unit is drawn out, take all precautions against dusting and damaging of the unit.
2. Place the case into the cut-out.
3. Use the supplied 4 sets of M4 custom screws, standard M4 nuts and washers to fix the case onto the panel. Drive the screws from the front first, then tighten the nuts on the washers from the backside of the panel.
4. Make sure that the supplied custom screws are used for mounting. Using any other screws may result in sealing failure and loss of protection degree of the cover!
5. Make sure that all 4 mounting holes are screwed and tightened. Fixing the case from lesser points may result in mechanical stresses and bending on the case construction due to possible deformations on the panel. Such inappropriate applications may harden driving the internal unit into or out of the case.
6. Always use torque drivers when working with the relay. Apply (0.69-0.82) Nm torque when tightening the nuts.

Inserting the internal unit and mounting the cover are done as described below.

1. Rotate the lock handle to provide an approximate angle of 90° between the handle and the internal unit. Drive the internal unit into the case until the unit fits well, the press the lock button to lock the unit in place. This will ensure healthy and robust electrical connection between the internal unit and the case.
 2. Place the bottom part of the cover into its place on the case first, then close the cover on the case. Make sure the cover fits in its place and the sealing is provided between the cover and the case. Tighten the mounting element integrated on the cover.
- 0.20 Nm torque is sufficient to provide IP52 protection when tightening the mounting element on the cover. Never apply torque values higher than 0.29 Nm! This may damage the mounting elements and may lead the cover out of service!

CABLING LTR-400

Cabling Schema

LTR-400 Lockout Relay circuit diagram is provided on the backside of this document.

Cabling Material

Cabling material selection is of great importance for all secondary systems. The principles listed below are to be followed to build a robust system.

Cabling with thin & multi-wire cables:

- Never make a connection without applying ferrules to wire ends!
- Use 8 mm wire end ferrules for all block terminals, which are labeled with numbers from 10 to 44. Using ferrules longer than 8 mm may reduce the dielectric withstand capability of the wiring!
- Provide solid earthing of the relay with low resistance earth grid. Use ring cable connectors for connections to relay earthing bolt. Make the earthing connection directly to earth. Never earth the device indirectly or over high resistances!
- **WARNING!** Solid earthing is one of the fundamental actions to provide minimum safety requirements. Before commissioning any electrical system, make sure that earthing process is done correctly according to the relevant standards!
- Use appropriate tools for crimping the ferrules. Preferably use crimping tools with trapeze cross-section crimping type.
- Use appropriate tools for stripping the cables. Preferably use stripping tools with adjustable stripping lengths. Apply the instructions of the ferrule manufacturer when stripping.
- Use appropriate tools for removing the outer coat of multi-core cables, if applicable. Preferably use cables with fillers and blades with adjustable cutting depths. Apply the instructions of the cable manufacturer.

- Use torque screwdrivers to tighten the terminal bolts. Apply (0.56 - 0.69) Nm torque to the bolts – torque application lower than 0.69 Nm may lead to open circuits or high contact resistances, while excessive torque application may damage the terminals!
- Use non-flammable, standards compliant cables.
- Determine the wire cross-sections according to relevant standards and engineering principles.

Cabling with single wire cables

Cabling with single wire cables is not recommended for secondary systems. Mechanical aging risks, increasing contact resistance over time, and poor flexibility are the leading cons of single wire cables. If cabling with single wire cables is essential, check all connections with great care and apply routine checking procedures to prevent failures.

SETTING LTR-400

LTR-400 Lockout Relays are delivered as all necessary adjustments and tests made, and there are no setting options for the relay, therefore, there are no actions that are needed to be taken by the user prior to commissioning.

COMMISSIONING LTR-400

Use the procedure below to commission each LTR-400 unit after the mounting and cabling actions are taken. The procedure of commissioning LTR-400 is examined below; note that some parts of the procedure are not related to the unit, thus are not explained thoroughly - so take professional help for these steps, if needed. Use appropriate devices during the tests to build and erect a healthy lockout system!

- **Auxiliary Supply Check** Auxiliary supply cabling and auxiliary power supply functionality tests.
- **Function Tests** Feed terminals no's 43 and 44 by appropriate auxiliary voltage and check to see each of the auxiliary contacts works as expected from terminal numbered from 10 to 42. Check that the devices to be controlled by the lockout relay (e.g. the circuit breaker) receives the signal from the unit. Test the system to make sure that LTR-400 locks out and can be unlocked normally.
- **Finalization** Energizing the primary circuit / Taking each related component under normal service conditions.

OPERATING LTR-400

Stand-by State

After the successful commissioning of LTR-400, normal standby conditions are reached; this condition is kept as long as system components operate correctly and there are no operating signals to the terminals no's 43 and 44 of LTR-400.

Activated state with outputs locked out

When the auxiliary supply terminals of no's 43 and 44 are fed by a master device (e.g. a protection relay), LTR-400 reacts as follows:

- The 4 auxiliary relays with SPDT (single-pole double-throw) construction operate to change-over their circuits. The normally-open contacts (e.g. 11 and 12) close and the normally-closed contacts (e.g. 10 and 11) open.
- The change-over contacts are locked out on their operated state by means of a mechanical lock. This means that the normally-open contacts (e.g. 11 and 12) will remain closed and the normally-closed contacts (e.g. 10 and 11) will remain open regardless of the supply continuity to the auxiliary supply terminals of no's 43 and 44; until the unit is reset.

Unlocking / resetting the LTR-400 unit and returning to stand-by state

Once the operation is acknowledged by the operator and appropriate actions on the whole system is taken (e.g. repairing of a defect on the primary power circuit), it is required that the lockout unit is reset by means of the mechanical resetting button on the front side of the relay, before the circuit breaker being controlled by the LTR-400 unit is reclosed. Note that, if the circuit breaker is attempted to be closed before the LTR-400 unit is unlocked / reset, the circuit breaker will be tripped by the LTR-400 unit immediately.

TESTING, MAINTENANCE AND REPAIRATION OF LTR-400

Under normal service conditions, no testing or maintenance action is required for LTR-400. If an LTR-400 unit somehow becomes unstable or out of service under a paranormal condition; testing, maintenance or repairation of the unit may become essential.

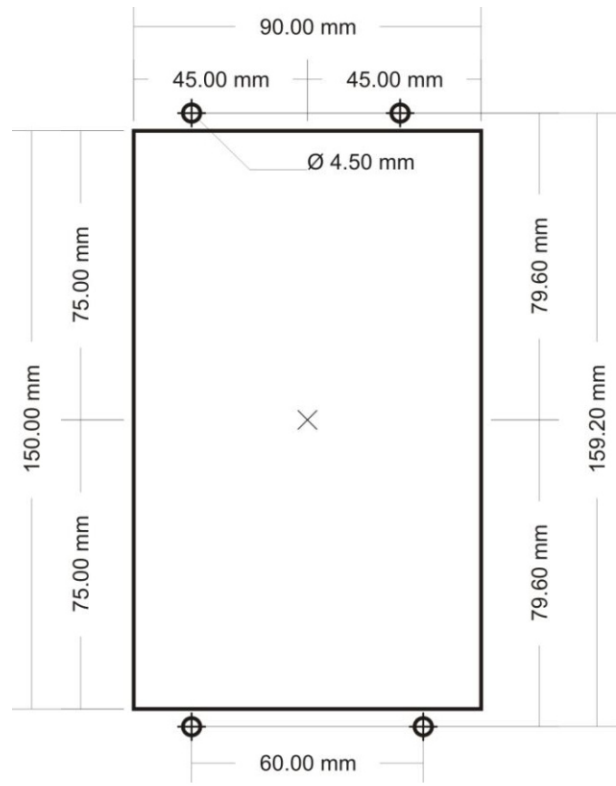
Apply the procedure at the "Commissioning LTR-400" section, and check to diagnose the following possible causes of irregularities:

- Check and see that the cabling of the unit is healthy.
- Check the availability of auxiliary supply voltage.
- Check and see that the auxiliary supply system operates correctly and supplies the unit within the specified supply voltage range.
- Check to see that;
 - o The master circuits that are controlling the supply of LTR-400 units (e.g. protection relays) are healthy and operating correctly.
 - o The receiver circuits of external devices (e.g. circuit breakers) are healthy and operating correctly.

If no diagnosis for the reason of malfunction can be spotted, contact DEMA Relay Company for further assistance and advanced diagnosis methods.

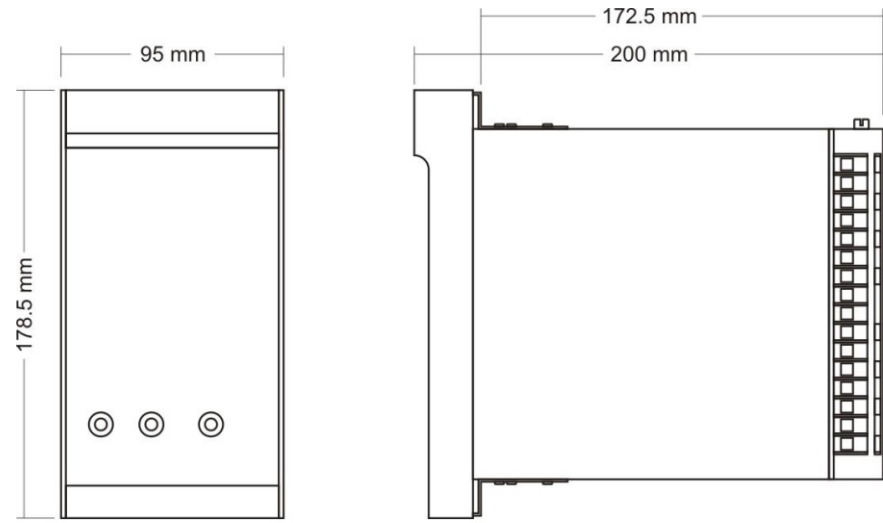
Note that, if somehow repairation is needed for the device, there is no need to remove the cabling from LTR-400 terminals. Simply draw out the internal unit to replace it immediately with a spare unit.

LTR-400 Cutout Dimensions



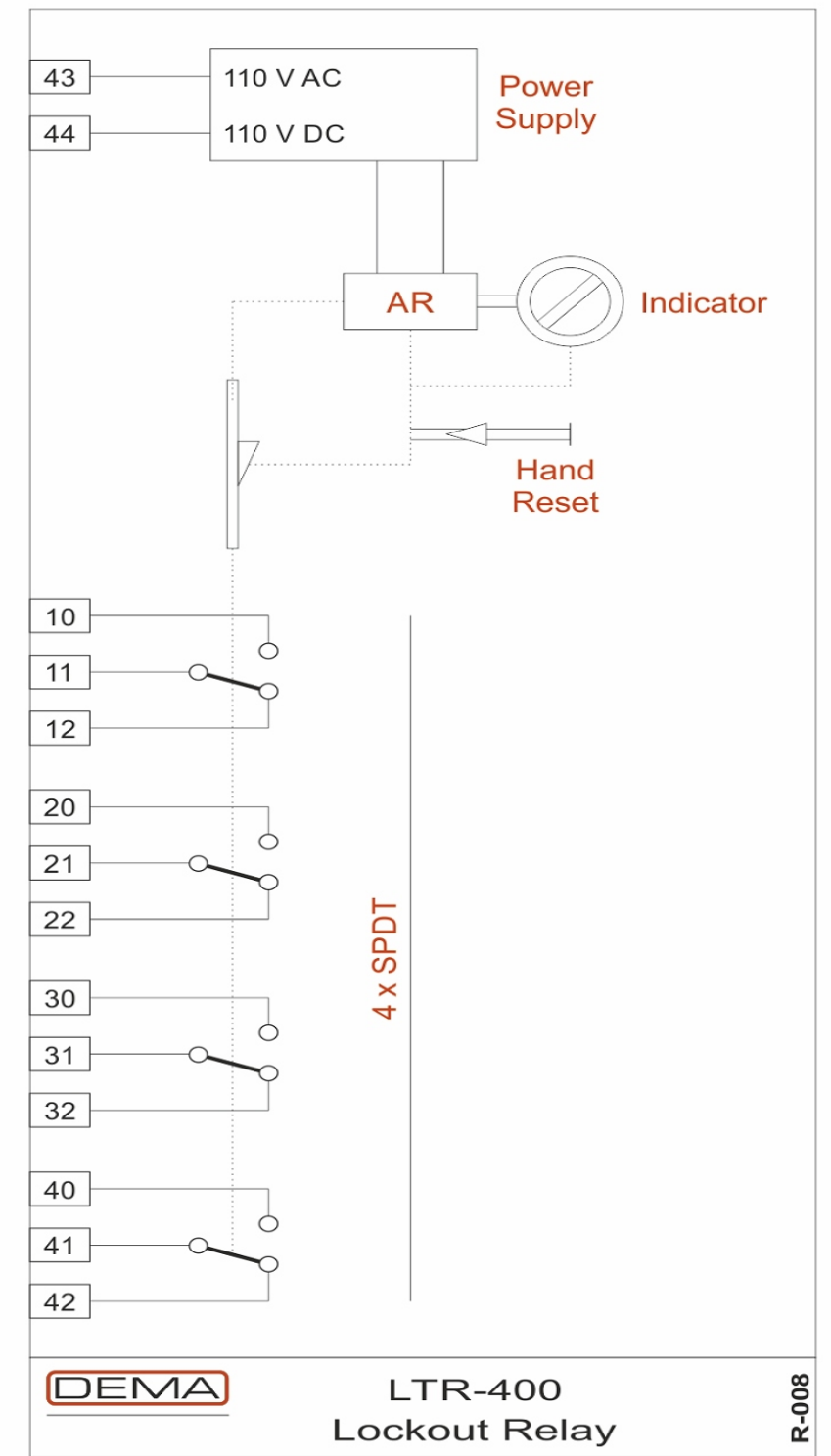
DRC 96 - S2 Cutout Drawing

LTR-400 Unit Dimensions



DEMA LTR-400 Overall Dimensions

LTR-400 Circuit Diagram



DEMA LTR-400 Circuit Diagram