

Application Tip



Tapchanger Backup Control - Three-Phase vs. One-Phase



The M-5329 Three-Phase LTC Backup Control is operationally equivalent to three M-0329 LTC (single-phase) Backup Controls physically interconnected. The only difference is that the M-5329 has one setpoint level for all phases and each of the M-0329's must be set with individual setpoint levels.

The M-5329 is recommended for any application where a tapchanger control's operation may reasonably result in an undesirable voltage on more than one individual phase.

3-Phase LTC Backup Control M-5329

General Application: The M-5329 LTC Backup Control may be used in conjunction with any voltage regulating device to provide either or both A) independent backup protection against control runaway or B) first-house protection in conjunction with the main control's LDC (line drop compensation).

In applications where the tapchanger control is based on one phase of a circuit but the tapchanger operation effects other phases or circuits, such as three-phase transformers or regulators, the M-5329 is suggested if the phase voltage unbalance on the regulated bus is unusually high, (>2-3 V). Examples of high phase voltage unbalance conditions are:

- High load unbalances with high LDC
- Single phase load interruption
- Possibility of control voltage input errors

The main control will be limited if ANY of the three separate input voltages (usually the three separate phase voltages of the circuit) exceed the settings.

LTC Backup Control M-0329

General Application: The M-0329 LTC Backup Control may be used in conjunction with any voltage regulating device to provide either or both A) independent backup protection against control runaway or B) first-house protection in conjunction with the main control's LDC (line drop compensation).

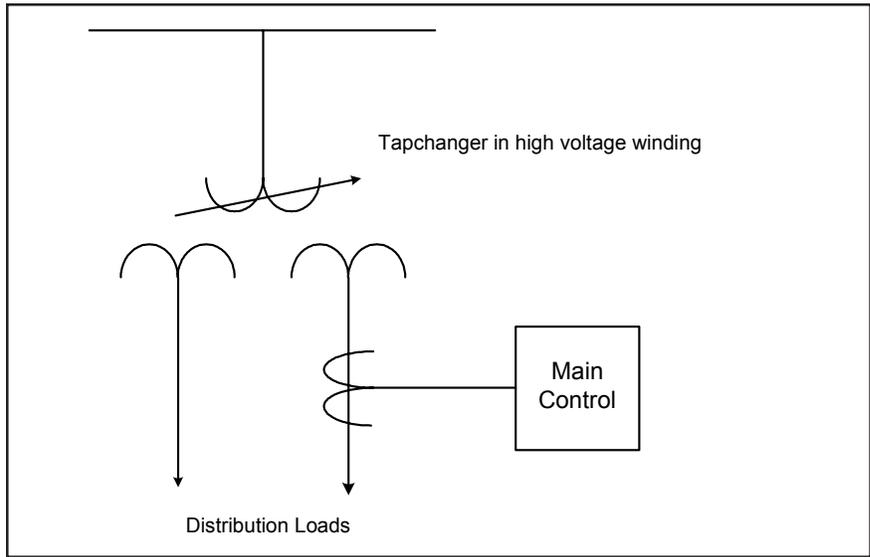
The M-0329 is suggested on single-phase tapchanger devices such as single-phase LTC (load tap changing) transformers or single-phase regulators.

In applications where the tapchanger control is based on one phase of a circuit but the tapchanger operation effects other phases or circuits, such as three-phase transformers or regulators, the M-0329 is adequate if the phase voltage unbalance on the regulated bus is not unusually high.

The main control will be limited ONLY if the single input voltage (usually the control voltage) exceeds the settings.



**Special Application:
Three-phase transformer
with dual secondaries
and primary winding
tapchanger.**



Three-Phase LTC Backup Control M-5329

In the special application shown above, the one single-phase control is not only effecting the circuit's three phases but also another circuit's three phases. The loads on the two circuits can be very different and therefore result in substantially different bus voltages.

If the phase voltage unbalance on either circuit is not unusually high, the main control can be satisfactorily supervised by a single M-5329. Three different voltages can be used to supervise the output of the main control although, theoretically, only two are required. These can be any combination of phase voltages including at least one from each circuit (which is recommended).

If the phase voltage unbalance on either circuit is unusually high, the main control can be satisfactorily supervised by the use of an M-5329 on that circuit and an M-0329 on the more stable circuit. Control interconnection wiring is required.

A decision to use two M-5329's to accommodate unusually high phase unbalances on BOTH circuits must be considered.

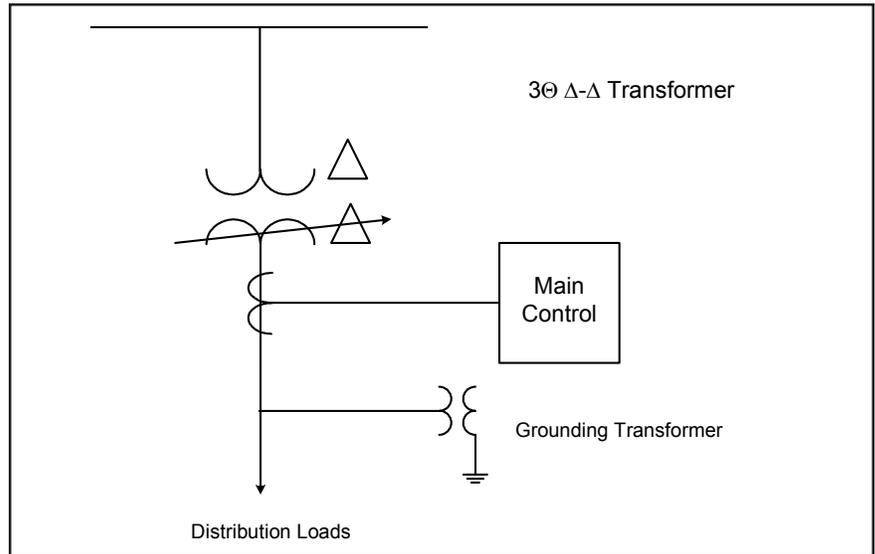
LTC Backup Control M-0329

In the special application shown above, the one single-phase control is not only effecting the circuit's three phases but also another circuit's three phases. The loads on the two circuits can be very different and therefore result in substantially different bus voltages.

If the phase voltage unbalance on either circuit is not unusually high, the main control can be satisfactorily supervised by an M-0329 on each of the two circuit voltages. This results in the installation of two backup controls as well as the more complicated wiring between the two and the main control.

If the phase voltage unbalance on either circuit is unusually high, the main control cannot be satisfactorily supervised without multiple M-0329s being used.

**Special Application:
Three-phase LTC Delta
Transformer with
associated grounding
transformer on grounded
distribution circuit.**



Three-Phase LTC Backup Control M-5329

In the special application shown above, the one single-phase control is directly effecting the circuit's three phase-to-phase voltages. Because of zero sequence load current differences, this operation may not directly effect the three single phase-ground voltages equally.

For this application, one M-5329 is recommended to assure that the tap operation will not cause any single-phase voltage outside the preset limits.

For more information, contact:

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LTC Backup Control M-0329

In the special application shown above, the one single-phase control is directly effecting the circuit's three phase-to-phase voltages. Because of zero sequence load current differences, this operation may not directly effect the three single phase-ground voltages equally.

For this application, with the three-phase M-5329 available, three M-0329's are not recommended because of the considerable interconnection wiring required.