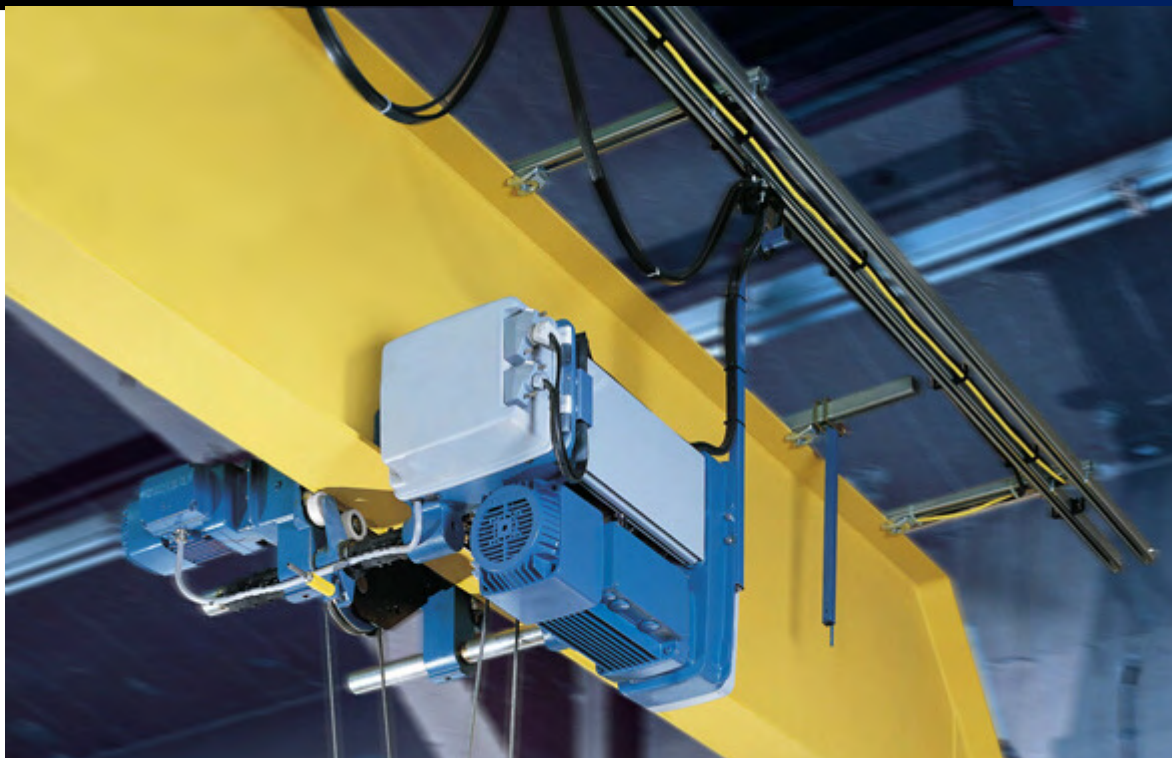


# THREE PHASE

## Product FOCUS Information and Application Handout



## LXPRC/S

Three Phase Relay



## Overview

The ***LXPRC/S*** is a DIN Rail mount, True R.M.S. Phase Monitoring Relay with adjustable Trip Levels and Time Delay. Designed to monitor a 3-phase supply and protect the equipment connected to it against under voltage, over voltage, phase reversal and phase loss conditions. Typically this product is used in conjunction with an external switching device i.e. contactor.

Adjustments for the Under voltage trip level and Over voltage trip level are scaled as a percentage of the product's nominal voltage<sup>1</sup>.

The Time Delay adjustment sets the period for which the relay remains energised for once the voltage has exceeded either trip level.

A green LED is used to indicate the status of the power supply being monitored. A red LED indicates the status of the internal relay.

A SPDT relay output is provided and rated at 8A, 250V AC.

## What's it used for?

The ***LXPRC/S*** is typically connected to the same 3-phase supply on which the equipment is installed and constantly monitors the supply for under voltage and over voltage conditions. Over voltages can lead to equipment such as transformers over heating whereas under voltages can lead to motors stalling.

Phase sequence detection ensures that 3-phase rotating devices (i.e. motors) do not run in the wrong direction should the phases be applied in the wrong order. Phase loss detection prevents motors from running on just two phases.

The purpose of the ***LXPRC/S*** is to then switch off the supply to the equipment when any of the above conditions occur.

## Where's it used?

Although not exhaustive, Control Panels, Distribution Boards, Consumer Units, Motor Control Centres, Motors and Generating Sets.

<sup>1</sup> Nominal voltage specified at the time of ordering

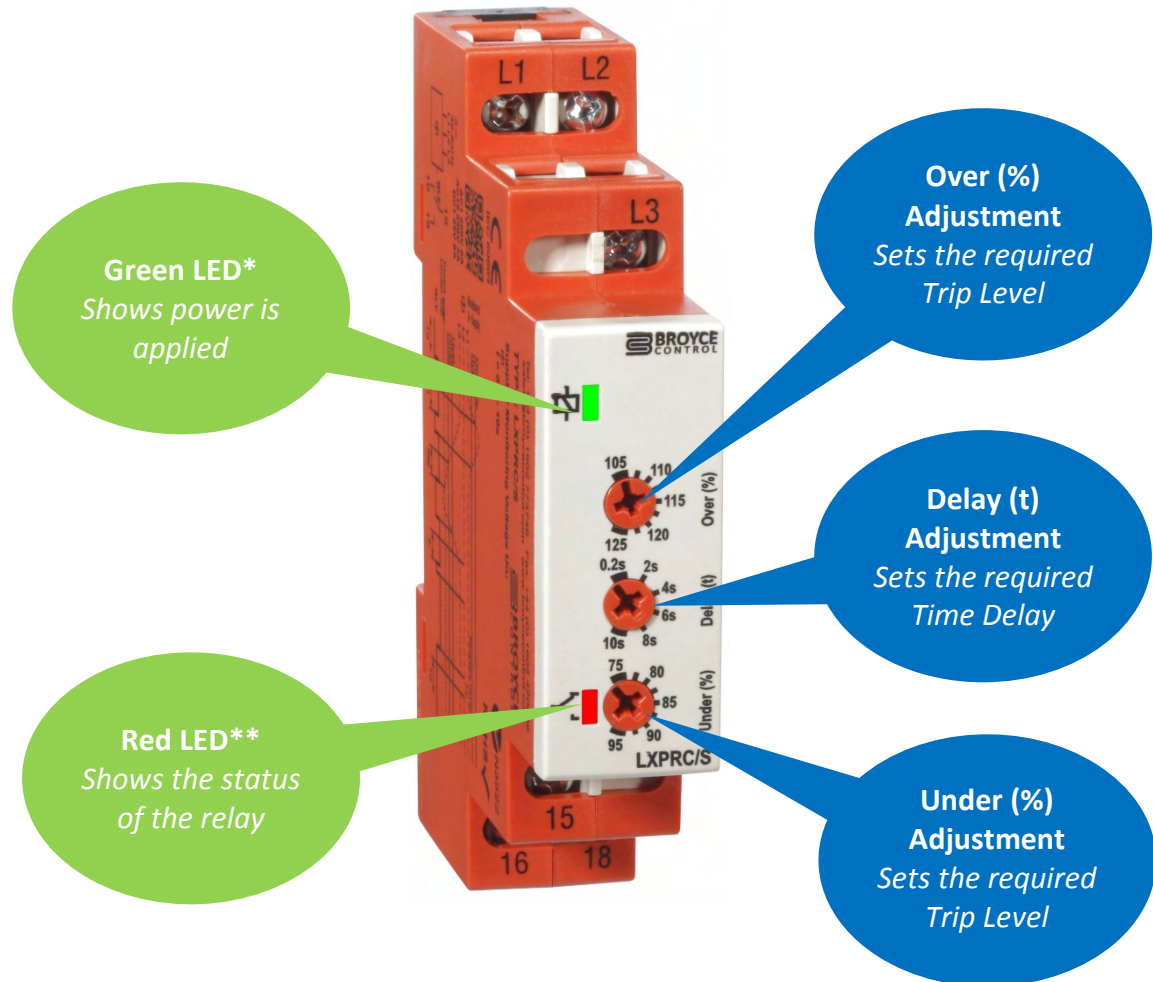


*Clicking on a Product part number shown in bold/italic will take you to a Technical Data Sheet*





## User Settings and Indicators



\* LED flashes during a phase reversal condition

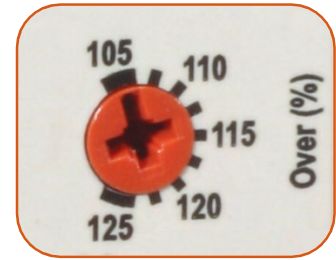
\*\* LED flashes during time delay (delay to the relay de-energising after the voltage exceeding the set trip level)



## User Settings and Indicators

### Over voltage Trip Level

Scaled as a “percentage” of the nominal voltage, this adjustment sets the trip point at which the relay will de-energise (after the set time delay) if any one of the phases increases above this setting. When the phase(s) decrease below this trip setting (minus the hysteresis value), the relay re-energises again.



### Under voltage Trip Level

Also scaled as a “percentage” of the nominal voltage, this adjustment sets the trip point at which the relay will de-energise (after the set time delay) if any one of the phases decreases below this setting. When the phase(s) increase above this trip setting (plus the hysteresis value), the relay re-energises again.



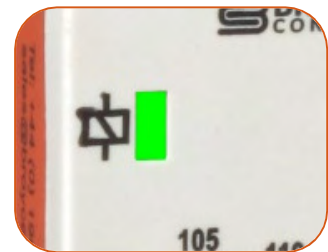
### Time Delay<sup>2</sup>

The Time delay adjustment is used to set a delay period between either an under voltage or over voltage condition being detected and the relay de-energising. This feature is used typically to allow momentary dips in the supply to be ignored and hence prevent the output relay from changing state.



### Green LED (Power Supply Status)

The green LED indicates power is applied to the Relay when permanently lit. If two phases are reversed, the LED flashes.



### Red LED (Relay/Timing Status)

The red LED illuminates when there is no fault detected. The red LED permanently lit also signifies the relay is in the energised state. During a time out condition (i.e. when the voltage has exceeded either trip level), the LED will flash for the period set on the Time delay adjustment. After this, the LED will extinguish along with the relay de-energising.



<sup>2</sup> The Time delay only applies to under or over voltage conditions. During phase loss or all phases being removed, the relay will de-energise immediately.



## Output Relay

A SPDT relay output is provided and typically operates in a “fail-safe” mode. In normal operation, the relay is energised and de-energises when a fault occurs. If all phases are lost, the relay also de-energises.



Also in the range...

## Phase Monitoring Relay variants



Not all applications require a product that offers all the features on the LXPRC/S. Therefore, in the LX range are models that monitor for just phase loss, phase reversal and under voltage or just simply, phase loss/reversal. In some instances, the requirement of the specifier may be that a product with only certain features be used in an application in order to keep things simple.

In addition, these models can also be specified to be used on 4-wire (3P + N) supplies. These models are identified by ending in “-4W” on the part number (i.e. LXPRC/S-4W). These products will measure phase to neutral voltages and also detect Neutral loss.

Part Number	Description
<b>LXPRC<sup>3</sup></b>	Under and Over voltage plus Time Delay
<b>LXPRT<sup>3</sup></b>	Under voltage, Phase loss, Sequence plus Time Delay
<b>LXPRF</b>	Phase loss, Sequence
<b>LXPRC/S-4W<sup>3</sup></b>	Under and Over voltage, Phase loss, Sequence plus Time Delay
<b>LXPRC-4W<sup>3</sup></b>	Under and Over voltage plus Time Delay
<b>LXPRT-4W<sup>3</sup></b>	Under voltage, Phase loss, Sequence plus Time Delay
<b>LXPRF-4W</b>	Phase loss, Sequence

## Voltage selection

Depending on the product type, the monitoring/supply voltage<sup>4</sup> should be chosen carefully to suit the application. It should also be understood that the voltages are specified as “nominal voltages” or “voltage ranges”. The following table explains in further detail the voltage options available for each product.

Part Number	Intended connection method	Voltage options <sup>4,5</sup>	Suitable for the following nominal supply voltages <sup>5</sup>
LXPRC/S, LXPRC	3P	110V	110V
	3P	208V	208V
	3P	220V	220V
	3P	380V	380V
	3P	400V	400V
	3P	415V	415V
LXPRT, LXPRF	3P	77 – 143V	110V
	3P	161 – 300V	208, 220V
	3P	280 – 520V	380, 400, 415, 440, 460V
LXPRC/S-4W, LXPRC-4W	3P + N	63.5V	63.5V
	3P + N	110V	110V
	3P + N	127V	127V
	3P + N	220V	220V
	3P + N	230V	230V
	3P + N	240V	240V

Continued....



Part Number	Intended connection method	Voltage options <sup>4</sup>	Suitable for the following nominal supply voltages <sup>5</sup>
LXPRT-4W, LXPRF-4W	3P + N	44.5 – 82.5V	63.5V
	3P + N	93 – 173V	120, 127V
	3P + N	161 – 300V	220, 230, 240, 254, 265V

<sup>3</sup> Trip level and Time delay settings are adjustable on these products

<sup>4</sup> Specified at the time of ordering

<sup>5</sup> Voltages are shown as phase to phase for 3P (3-wire) products and phase to neutral on 3P + N (4-wire) products

Visit [www.broycecontrol.com](http://www.broycecontrol.com) for product data sheets on the above products and those on the previous page.



## Glossary

Terminology	Meaning
True R.M.S. (Root Mean Square)	The RMS value of an alternating current which is also known as it's " <i>heating value</i> ", as it is a voltage which is equivalent to the direct current value that would be required to get the same heating effect
Nominal voltage	Standardised supply voltage in which equipment is connected to
Over voltage	Condition when one or more phases are higher than the nominal voltage
Under voltage	Condition when one or more phases are lower than the nominal voltage
Time delay	Period in which the internal relay remains in a particular state before changing over
Hysteresis	Usually specified as a percentage and defines how far the supply voltage must change before the relay reverts back to it's no fault state (energised)
Phase loss	Condition that occurs due to a blown fuse, broken wire or worn contact
Phase reversal	Reversing of any two phases which will cause rotating equipment to rotate in the opposite direction
Single phasing	Condition when a phase is lost
Re-generative voltage	Voltage generated from a motor when a phase has been lost. Voltage is dependent on motor size and other loads that may be present on the missing phase





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BROYCE CONTROL LTD

Pool Street  
Wolverhampton  
West Midlands  
WV2 4HN  
United Kingdom

Tel: +44 (0) 1902 773746  
Fax: +44 (0) 1902 420639

[www.broycecontrol.com](http://www.broycecontrol.com)  
[sales@broycecontrol.com](mailto:sales@broycecontrol.com)