

# Knockout Liquidity

Knockout liquidity behaves identical to range-based concentrated liquidity, except the liquidity is atomically and permanently removed from the AMM curve at any point the curve price moves past the edge of the range. Knockout liquidity can either be set to remove when curve price falls below the bottom of the range (bids ) or when curve price rises above the top of the range (asks ).

Knockout liquidity behaves somewhat similar to "non-reversible limit orders" found in traditional central limit order books. A user who wants to achieve directional execution at better than current market prices, can buy (sell) in the pool by placing a bid (ask) below (above) the current price. As long as the price at one point crosses this point the user's order will be filled. Unlike a vanilla concentrated liquidity range order, even if the price rises back over the fill price, the tokens the user bought will not convert back. Instead the user locks in the direction and price.

For this reason, knockout liquidity is a useful tool for users who want directional execution, but want to receive more advantageous prices than traditional swaps. A knockout liquidity order offers better prices from 1) waiting for a cheaper price, 2) receiving instead of paying swap fees, 3) avoiding price slippage on the AMM curve. The downside though is that if the curve price never ends up reaching the knockout price, the order may never get filled, and the user will have to cancel and re-adjust.

In practice knockout liquidity is subject to a few restrictions the user should be aware. First, unlike typical concentrated liquidity, the width of the range order is fixed (at a typically narrow width) for all knockout orders in the entire pool. Second, knockout bids must always be placed below the current curve price and knockout asks above the current curve price. Third, in order to be fully knocked out, the price must move fully through the entire range. It's possible for the order to be "partially filled" if the curve moves into the middle of the range. And to convert back if the price moves back out of the range without ever reaching the knockout price.

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