

FAQ on Price Reasonability Check (PRC) functionality

1. What is Price Reasonability Check (PRC)?

Price Reasonability Check (PRC) is a new risk management feature that helps in reducing order entry errors and ensures that the entered prices of Limit Buy Orders or Limit Sell Orders are not too far away from the actual market price.

It validates that the new (Incoming) limit order price does not exceed the specified price reasonability range applicable at that particular time.

2. What is the purpose/advantage of PRC?

- The feature has been introduced to further strengthen the Exchange's pre-trade risk management framework.
- This feature is on the lines of globally prevalent risk management measures and shall primarily reduce the potential instances of market abuse and fat-finger errors and further facilitate true price discovery and investor protection.
- In PRC functionality, each new (incoming) limit order price shall be validated with the Exchange defined Price Reasonability Range (PRR). PRR shall be dynamically computed and applied by the trading system using a real-time reference price.
- This shall ensure that the price of an incoming limit order is not too far off from the prevailing market prices.

3. Which orders are checked for Price Reasonability?

All Incoming & modified Limit orders and Stop Loss Limit orders are checked for price reasonability. Price of incoming limit orders are checked with regard to Price Reasonability Range (PRR) prevailing at that point of time.

4. What is the reference price used for calculating the Price Reasonability Range (PRR)?

The Reference price is the Best Bid/Offer price (BBO) i.e. Best Buy price or Best Sell price available when the incoming order is entered. PRR is computed dynamically. The Reference price is

- the Best Sell Price for validation of Incoming Buy orders
- the Best Buy Price for validation of Incoming Sell orders

Any incoming order outside PRR prevailing at that point of time will be rejected.

5. What happens if Best Bid/Offer price (BBO) is not available?

When BBO is too wide or is not available, depending upon market conditions and the availability of the Best Buy Price or the Best Sell price, a relevant reference price is chosen, as below –

- If there is no BBO – (See Scenario #2 & 3 in Examples section)
 - LTP shall be used as a Reference price.
 - If there is no LTP, then Previous Close price is used as the Reference price
- If there is no Buy price but Sell Price is available – (See Scenario #4 in Examples section)
 - Reference price for validation of an Incoming Sell Order is lower of the Best Sell price or LTP
 - Reference price for validation of an Incoming Buy Order is the Best Sell price

- If there is no Sell price but Buy Price is available – (See Scenario #5 in Examples section)
 - Reference price for validation of an Incoming Buy Order is higher of the Best Buy price or LTP
 - Reference price for validation of an Incoming Sell Order is the Best Buy price
- If the difference between the Best Buy price and Best Sell price is too wide and LTP is between BBO (See Scenario #6 in Examples section)
 - LTP is used as a Reference price.
- If difference between the Best Buy price and Best Sell price is too wide and LTP falls outside the BBO (See Scenario #7 in Examples section)
 - Best Buy Price or the Best Sell price is used as the reference price.

6. How is the Price Reasonability Range (PRR) calculated?

Price Reasonability Range (PRR) can be defined either as a percentage or as an absolute value (in Rs.) relative to the reference price. The Reference price is

- the Best Sell Price for validation of Incoming Buy orders
- the Best Buy Price for validation of Incoming Sell orders

E.g. +/- 5% of Reference price or +/- Rs. 1 from Reference price

7. What is the difference between Price Bands & PRC?

The existing risk management feature of Price Bands shall continue. Price bands would work in conjunction with the Price Reasonability Check (PRC). PRR shall be within the applicable Price Bands defined for each contract/security.

8. How will Price Bands & PRC work together?

Let us take an illustration to explain this:

Price band for contract => Lower circuit limit is 95, Upper circuit limit is 105

PRR value set as Rs. 1 from Reference price (BBO)

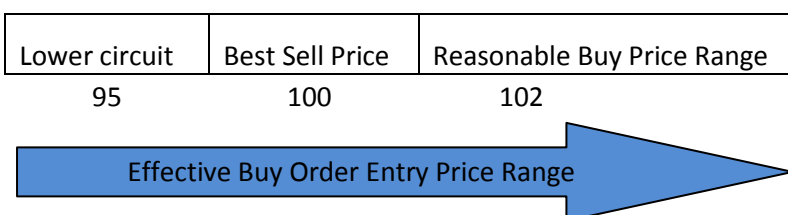
Best Buy price = 100, Best Sell price = 101

Therefore PRR = 99 to 102

1. Any incoming Buy order cannot have a price which is	Above PRR of 102	Below Circuit limit of 95
2. Any incoming Sell order cannot have a price which is	Below PRR of 99	Above Circuit limit of 105

a. The effective order entry range for incoming buy limit orders is between the lower price band value and the boundary of the Price Reasonability range. (See Scenario #1 in Examples section)

E.g. price band for a contract is Rs.95 – 105



b. The effective order entry range for incoming sell limit orders is between the higher price band value and the boundary of the Price Reasonability range. (See Scenario #1 in Examples section)
 E.g. price band for a contract is Rs.95 – 105



9. What will happen if the order price is outside the Price Reasonability range?

The order will get rejected with a message “Buy price is not reasonable to Ref. price XXX” or “Sell price is not reasonable to Ref. price XXX”

10. Are market orders covered by PRC?

Market orders are NOT covered by PRC.

11. How are Stop Loss Orders validated against PRC?

For Stop Loss orders, the difference between the entered trigger price and the entered limit price is checked such that it does not violate the reasonability range and the trigger price is considered as the reference price.

12. Which Products are covered under PRC?

The PRC functionality shall be applicable for all futures and options contracts in the Equity Derivatives segment. It shall not be applicable for Paired Options and Calendar Spread Futures contracts.

13. Can PRC be relaxed?

The Exchange may relax the applicable Price Reasonability Range depending on prevalent market conditions.

14. How is PRC effective in reducing fat finger errors?

A trader cannot enter large out of bound limit orders which are far away from the prevailing price levels due to the applicable Price Reasonability Range. Thus, PRC prevents the price of the instrument moving by a big measure with one single limit order but at the same time does not prevent the price moving in either direction in an orderly and step-by-step manner.

15. Can you provide some examples as to how PRC would work under various scenarios?

EXAMPLES:

Assumptions:

- Price Reasonability Range (PRR) is set at absolute value of Rs. 1
- Lower circuit limit is 95
- Upper circuit limit is 106

- Previous close is 101.00
- LTP is 99

Scenario #1: Where BBO is present and the spread between the BBO is not too wide

Best Buy (Bid) price	Best Sell (Offer) Price
100	100.20

In this case,

- BBO spread is present
- BBO spread is 0.20
- Reference price is
 - Best Sell price for Incoming Buy limit orders
 - Best Buy price for Incoming Sell limit orders
- Reasonability Range (PRR) shall be as follows -
 - Reasonable Buy Range limit (which means the maximum price upto which a Buy order would be accepted) is $100.20 \text{ (Best Sell price)} + \text{Rs } 1 \text{ (PRR)} = 101.20$
 - Therefore Buy limit orders would be accepted between 95 to 101.20
 - Buy limit orders entered at a price above 101.20 would be rejected
 - Reasonable Sell Range limit (which means the minimum price upto which a Sell order would be accepted) would be $100 \text{ (Best Buy price)} - \text{Rs } 1 \text{ (PRR)} = 99$
 - Therefore Sell orders would be accepted between 106 to 99.
 - Sell limit orders entered at a price below 99 would be rejected

Scenario #2: Where BBO is absent and there is no LTP

Best Buy (Bid) price	Best Sell (Offer) Price
-	-

Previous Close Price = 101

In this case,

- BBO spread is absent
- Hence, Last traded price (LTP) shall be used as a Reference price. If there is no LTP, then Previous Close price (Pr. Close) is used as the Reference price.
 - Since there is no LTP, Reference price is Previous Close price for Incoming Buy & Sell limit orders
- Reasonability Range (PRR) shall be as follows -
 - Reasonable Buy Range limit is $101 \text{ (Pr. Close)} + \text{Rs } 1 \text{ (PRR)} = 102$
 - Therefore Buy limit orders would be accepted between 95 to 102
 - Buy limit orders entered at a price above 102 would be rejected
 - Reasonable Sell Range limit would be $101 \text{ (Pr. Close)} - \text{Rs } 1 \text{ (PRR)} = 100$
 - Therefore Sell orders would be accepted between 106 to 100.
 - Sell limit orders entered at a price below 100 would be rejected

Scenario #3: Where BBO is absent and LTP is available

Best Buy (Bid) price	Best Sell (Offer) Price
-	-

LTP = 99

In this case,

- BBO spread is absent
- Hence, Last traded price (LTP) shall be used as a Reference price for Incoming Buy & Sell limit orders
- Reasonability Range (PRR) shall be as follows -
 - Reasonable Buy Range limit is 99 (LTP) + Rs 1 (PRR) = 100
 - Therefore Buy limit orders would be accepted between 95 to 100
 - Buy limit orders entered at a price above 100 would be rejected
 - Reasonable Sell Range limit would be 99 (LTP) - Rs 1 (PRR) = 98
 - Therefore Sell orders would be accepted between 106 to 98.
 - Sell limit orders entered at a price below 98 would be rejected

Scenario #4: Where there is no Buy price, Only Sell price is available

Best Buy (Bid) price	Best Sell (Offer) Price
-	100.20

LTP = 99

In this case,

- No buy orders are present
- Reference price is
 - Best Sell price for Incoming Buy limit orders
 - Best Sell price or LTP, whichever is lower for Incoming Sell limit orders
- Reasonability Range (PRR) shall be as follows -
 - Reasonable Buy Range limit is 100.20 (Best Sell price) + Rs 1 (PRR) = 101.20
 - Therefore Buy limit orders would be accepted between 95 to 101.20
 - Buy limit orders entered at a price above 101.20 would be rejected
 - Reasonable Sell Range limit would be 99 (lower of LTP or Best Sell price) - Rs 1 (PRR) = 98
 - Therefore Sell orders would be accepted between 106 to 98.
 - Sell limit orders entered at a price below 98 would be rejected

Scenario #5: Where there is no Sell price, Only Buy price is available

Best Buy (Bid) price	Best Sell (Offer) Price
100	-

LTP = 99

In this case,

- No sell orders are present
- Reference price is
 - Best Buy price or LTP, whichever is higher for Incoming Buy limit orders
 - Best Buy price for Incoming Sell limit orders
- Reasonability Range (PRR) shall be as follows -
 - Reasonable Buy Range limit is 100 (higher of Buy price or LTP) + Rs 1 (PRR) = 101
 - Therefore Buy limit orders would be accepted between 95 to 101
 - Buy limit orders entered at a price above 101 would be rejected
 - Reasonable Sell Range limit would be 100 (Best Buy price) - Rs 1 (PRR) = 99

- Therefore Sell orders would be accepted between 106 to 99.
- Sell limit orders entered at a price below 99 would be rejected

Scenario #6: Where BBO is present, but BBO is too wide and LTP is between the BBO

Best Buy (Bid) price	Best Sell (Offer) Price
100	102

LTP = 101

In this case,

- BBO spread is too wide i.e. Spread is greater than PRR of Rs. 1
- Hence, LTP shall be used as the Reference price for Incoming Buy & Sell limit orders
- Reasonability Range (PRR) shall be as follows -
 - Reasonable Buy Range limit is 101 (LTP) + Rs 1 (PRR) = 102
 - Therefore Buy limit orders would be accepted between 95 to 102
 - Buy limit orders entered at a price above 102 would be rejected
 - Reasonable Sell Range limit would be 101 (LTP) - Rs 1 (PRR) = 100
 - Therefore Sell orders would be accepted between 106 to 100
 - Sell limit orders entered at a price below 100 would be rejected

Scenario #7: Where BBO is present, but BBO is too wide and LTP is not between the BBO

Best Buy (Bid) price	Best Sell (Offer) Price
100	102

LTP = 99

In this case,

- BBO spread is too wide i.e. Spread is greater than PRR of Rs. 1
- Additionally, LTP falls outside the BBO, hence BBO is used as the reference price as normally done
- Reasonability Range (PRR) shall be as follows -
 - Reasonable Buy Range limit is 102 (Best Sell price) + Rs 1 (PRR) = 103
 - Therefore Buy limit orders would be accepted between 95 to 103
 - Buy limit orders entered at a price above 103 would be rejected
 - Reasonable Sell Range limit would be 100 (Best Buy price) - Rs 1 (PRR) = 99
 - Therefore Sell orders would be accepted between 106 to 99.
 - Sell limit orders entered at a price below 99 would be rejected

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