

|            | <b>Product Specifications</b><br><b>For</b><br><b>SPRING-SPRING MECHANISM</b> | Drg. No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                |      |                |       |       |   |                     |    |         |   |                     |   |                           |   |                                   |   |                   |   |                                                                   |  |  |    |              |     |            |    |                                          |     |           |   |                                                   |     |      |   |                                                   |     |      |   |                              |    |                              |   |                   |    |                     |   |                    |    |                 |    |                 |    |                |    |                     |    |               |
|------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|------|----------------|-------|-------|---|---------------------|----|---------|---|---------------------|---|---------------------------|---|-----------------------------------|---|-------------------|---|-------------------------------------------------------------------|--|--|----|--------------|-----|------------|----|------------------------------------------|-----|-----------|---|---------------------------------------------------|-----|------|---|---------------------------------------------------|-----|------|---|------------------------------|----|------------------------------|---|-------------------|----|---------------------|---|--------------------|----|-----------------|----|-----------------|----|----------------|----|---------------------|----|---------------|
|            |                                                                               | Date                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 15.09.2018                     |      |                |       |       |   |                     |    |         |   |                     |   |                           |   |                                   |   |                   |   |                                                                   |  |  |    |              |     |            |    |                                          |     |           |   |                                                   |     |      |   |                                                   |     |      |   |                              |    |                              |   |                   |    |                     |   |                    |    |                 |    |                 |    |                |    |                     |    |               |
|            |                                                                               | Product                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>SPRING-SPRING MECHANISM</b> |      |                |       |       |   |                     |    |         |   |                     |   |                           |   |                                   |   |                   |   |                                                                   |  |  |    |              |     |            |    |                                          |     |           |   |                                                   |     |      |   |                                                   |     |      |   |                              |    |                              |   |                   |    |                     |   |                    |    |                 |    |                 |    |                |    |                     |    |               |
| <b>1.0</b> | <b>Application</b>                                                            | : Used for closing and opening operation<br>Of the circuit breaker                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                |      |                |       |       |   |                     |    |         |   |                     |   |                           |   |                                   |   |                   |   |                                                                   |  |  |    |              |     |            |    |                                          |     |           |   |                                                   |     |      |   |                                                   |     |      |   |                              |    |                              |   |                   |    |                     |   |                    |    |                 |    |                 |    |                |    |                     |    |               |
| <b>2.0</b> | <b>Configuration</b>                                                          | : Spring- spring mechanism is enclosed with<br>protective cover. The system is designed<br>in such a way that that drive can be<br>mounted easily to circuit breaker                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                |      |                |       |       |   |                     |    |         |   |                     |   |                           |   |                                   |   |                   |   |                                                                   |  |  |    |              |     |            |    |                                          |     |           |   |                                                   |     |      |   |                                                   |     |      |   |                              |    |                              |   |                   |    |                     |   |                    |    |                 |    |                 |    |                |    |                     |    |               |
| <b>3.0</b> | <b>Quantity</b>                                                               | : 1 No.s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                |      |                |       |       |   |                     |    |         |   |                     |   |                           |   |                                   |   |                   |   |                                                                   |  |  |    |              |     |            |    |                                          |     |           |   |                                                   |     |      |   |                                                   |     |      |   |                              |    |                              |   |                   |    |                     |   |                    |    |                 |    |                 |    |                |    |                     |    |               |
| <b>4.0</b> | <b>Specifications:</b>                                                        | <table border="1"> <thead> <tr> <th>S.No</th><th>Specifications</th><th>Units</th><th>Value</th></tr> </thead> <tbody> <tr> <td>1</td><td>Total stroke length</td><td>mm</td><td>230-250</td></tr> <tr> <td>2</td><td>Motor rated voltage</td><td>V</td><td>240VAC,+10%,-<br/>15%,50Hz</td></tr> <tr> <td>3</td><td>Rated voltage on control circuits</td><td>V</td><td>220 VDC,-30%,+10%</td></tr> <tr> <td>4</td><td>Dynamic performance while operating<br/>with 145kV Circuit breaker</td><td></td><td></td></tr> <tr> <td>4a</td><td>Opening time</td><td>sec</td><td>≈0.02-0.03</td></tr> <tr> <td>4b</td><td>Total break time (opening + arcing time)</td><td>sec</td><td>0.05-0.06</td></tr> <tr> <td>5</td><td>Average contacts velocity at opening<br/>operation</td><td>m/s</td><td>≈7-8</td></tr> <tr> <td>6</td><td>Average contacts velocity at closing<br/>operation</td><td>m/s</td><td>≈3-4</td></tr> <tr> <td>7</td><td>Operating energy for opening</td><td>KJ</td><td>6 KJ<br/>(adjustable by +1KJ)</td></tr> <tr> <td>8</td><td>Drive arrangement</td><td>NA</td><td>Horizontal/Vertical</td></tr> <tr> <td>9</td><td>Operation sequence</td><td>NA</td><td>0-0.3s-CO-180s-</td></tr> <tr> <td>10</td><td>Mechanical life</td><td>NA</td><td>10000, "O-t-C"</td></tr> <tr> <td>11</td><td>Ambient temperature</td><td>NA</td><td>-10°Cto +50°C</td></tr> </tbody> </table> |                                | S.No | Specifications | Units | Value | 1 | Total stroke length | mm | 230-250 | 2 | Motor rated voltage | V | 240VAC,+10%,-<br>15%,50Hz | 3 | Rated voltage on control circuits | V | 220 VDC,-30%,+10% | 4 | Dynamic performance while operating<br>with 145kV Circuit breaker |  |  | 4a | Opening time | sec | ≈0.02-0.03 | 4b | Total break time (opening + arcing time) | sec | 0.05-0.06 | 5 | Average contacts velocity at opening<br>operation | m/s | ≈7-8 | 6 | Average contacts velocity at closing<br>operation | m/s | ≈3-4 | 7 | Operating energy for opening | KJ | 6 KJ<br>(adjustable by +1KJ) | 8 | Drive arrangement | NA | Horizontal/Vertical | 9 | Operation sequence | NA | 0-0.3s-CO-180s- | 10 | Mechanical life | NA | 10000, "O-t-C" | 11 | Ambient temperature | NA | -10°Cto +50°C |
| S.No       | Specifications                                                                | Units                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Value                          |      |                |       |       |   |                     |    |         |   |                     |   |                           |   |                                   |   |                   |   |                                                                   |  |  |    |              |     |            |    |                                          |     |           |   |                                                   |     |      |   |                                                   |     |      |   |                              |    |                              |   |                   |    |                     |   |                    |    |                 |    |                 |    |                |    |                     |    |               |
| 1          | Total stroke length                                                           | mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 230-250                        |      |                |       |       |   |                     |    |         |   |                     |   |                           |   |                                   |   |                   |   |                                                                   |  |  |    |              |     |            |    |                                          |     |           |   |                                                   |     |      |   |                                                   |     |      |   |                              |    |                              |   |                   |    |                     |   |                    |    |                 |    |                 |    |                |    |                     |    |               |
| 2          | Motor rated voltage                                                           | V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 240VAC,+10%,-<br>15%,50Hz      |      |                |       |       |   |                     |    |         |   |                     |   |                           |   |                                   |   |                   |   |                                                                   |  |  |    |              |     |            |    |                                          |     |           |   |                                                   |     |      |   |                                                   |     |      |   |                              |    |                              |   |                   |    |                     |   |                    |    |                 |    |                 |    |                |    |                     |    |               |
| 3          | Rated voltage on control circuits                                             | V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 220 VDC,-30%,+10%              |      |                |       |       |   |                     |    |         |   |                     |   |                           |   |                                   |   |                   |   |                                                                   |  |  |    |              |     |            |    |                                          |     |           |   |                                                   |     |      |   |                                                   |     |      |   |                              |    |                              |   |                   |    |                     |   |                    |    |                 |    |                 |    |                |    |                     |    |               |
| 4          | Dynamic performance while operating<br>with 145kV Circuit breaker             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                |      |                |       |       |   |                     |    |         |   |                     |   |                           |   |                                   |   |                   |   |                                                                   |  |  |    |              |     |            |    |                                          |     |           |   |                                                   |     |      |   |                                                   |     |      |   |                              |    |                              |   |                   |    |                     |   |                    |    |                 |    |                 |    |                |    |                     |    |               |
| 4a         | Opening time                                                                  | sec                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ≈0.02-0.03                     |      |                |       |       |   |                     |    |         |   |                     |   |                           |   |                                   |   |                   |   |                                                                   |  |  |    |              |     |            |    |                                          |     |           |   |                                                   |     |      |   |                                                   |     |      |   |                              |    |                              |   |                   |    |                     |   |                    |    |                 |    |                 |    |                |    |                     |    |               |
| 4b         | Total break time (opening + arcing time)                                      | sec                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.05-0.06                      |      |                |       |       |   |                     |    |         |   |                     |   |                           |   |                                   |   |                   |   |                                                                   |  |  |    |              |     |            |    |                                          |     |           |   |                                                   |     |      |   |                                                   |     |      |   |                              |    |                              |   |                   |    |                     |   |                    |    |                 |    |                 |    |                |    |                     |    |               |
| 5          | Average contacts velocity at opening<br>operation                             | m/s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ≈7-8                           |      |                |       |       |   |                     |    |         |   |                     |   |                           |   |                                   |   |                   |   |                                                                   |  |  |    |              |     |            |    |                                          |     |           |   |                                                   |     |      |   |                                                   |     |      |   |                              |    |                              |   |                   |    |                     |   |                    |    |                 |    |                 |    |                |    |                     |    |               |
| 6          | Average contacts velocity at closing<br>operation                             | m/s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | ≈3-4                           |      |                |       |       |   |                     |    |         |   |                     |   |                           |   |                                   |   |                   |   |                                                                   |  |  |    |              |     |            |    |                                          |     |           |   |                                                   |     |      |   |                                                   |     |      |   |                              |    |                              |   |                   |    |                     |   |                    |    |                 |    |                 |    |                |    |                     |    |               |
| 7          | Operating energy for opening                                                  | KJ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 6 KJ<br>(adjustable by +1KJ)   |      |                |       |       |   |                     |    |         |   |                     |   |                           |   |                                   |   |                   |   |                                                                   |  |  |    |              |     |            |    |                                          |     |           |   |                                                   |     |      |   |                                                   |     |      |   |                              |    |                              |   |                   |    |                     |   |                    |    |                 |    |                 |    |                |    |                     |    |               |
| 8          | Drive arrangement                                                             | NA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Horizontal/Vertical            |      |                |       |       |   |                     |    |         |   |                     |   |                           |   |                                   |   |                   |   |                                                                   |  |  |    |              |     |            |    |                                          |     |           |   |                                                   |     |      |   |                                                   |     |      |   |                              |    |                              |   |                   |    |                     |   |                    |    |                 |    |                 |    |                |    |                     |    |               |
| 9          | Operation sequence                                                            | NA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0-0.3s-CO-180s-                |      |                |       |       |   |                     |    |         |   |                     |   |                           |   |                                   |   |                   |   |                                                                   |  |  |    |              |     |            |    |                                          |     |           |   |                                                   |     |      |   |                                                   |     |      |   |                              |    |                              |   |                   |    |                     |   |                    |    |                 |    |                 |    |                |    |                     |    |               |
| 10         | Mechanical life                                                               | NA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 10000, "O-t-C"                 |      |                |       |       |   |                     |    |         |   |                     |   |                           |   |                                   |   |                   |   |                                                                   |  |  |    |              |     |            |    |                                          |     |           |   |                                                   |     |      |   |                                                   |     |      |   |                              |    |                              |   |                   |    |                     |   |                    |    |                 |    |                 |    |                |    |                     |    |               |
| 11         | Ambient temperature                                                           | NA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | -10°Cto +50°C                  |      |                |       |       |   |                     |    |         |   |                     |   |                           |   |                                   |   |                   |   |                                                                   |  |  |    |              |     |            |    |                                          |     |           |   |                                                   |     |      |   |                                                   |     |      |   |                              |    |                              |   |                   |    |                     |   |                    |    |                 |    |                 |    |                |    |                     |    |               |
| 1/2        |                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Signature</b>               |      |                |       |       |   |                     |    |         |   |                     |   |                           |   |                                   |   |                   |   |                                                                   |  |  |    |              |     |            |    |                                          |     |           |   |                                                   |     |      |   |                                                   |     |      |   |                              |    |                              |   |                   |    |                     |   |                    |    |                 |    |                 |    |                |    |                     |    |               |

|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |          |                            |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------------------------|
|                              | <b>Product Specifications</b><br><b>For</b><br><b>SPRING-SPRING DRIVE</b>                                                                                                                                                                                                                                                                                                                                                                                                                           | Drg. No. |                            |
|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Date     | 15.09.2018                 |
|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Product  | <b>SPRING-SPRING DRIVE</b> |
| <b>5.0</b><br><br><b>6.0</b> | <b>Qualifying Requirements:</b><br><br>The supplier shall be of national / International repute with proven record and should have supplied similar mechanisms. The supplier must submit along with the quotation a few references to whom the supplier has supplied a similar mechanisms.<br><br><b>Packing :</b><br><br>The components shall be packed in high density wooden boxes with a primary wrapped in polyethylene. The components shall be guaranteed against all manufacturing defects. |          |                            |
| 2/2                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |          | <b>Signature</b>           |