



| Type Test Report                                                                                                                               |             |           |       | Date of issue: 1.9.2015                                                    |         |                |          |                      |       |      |    |
|------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-----------|-------|----------------------------------------------------------------------------|---------|----------------|----------|----------------------|-------|------|----|
| Customer:                                                                                                                                      |             |           |       | Serial No.:                                                                |         |                |          |                      |       |      |    |
| Customer ref.:                                                                                                                                 |             |           |       | Type: M3AA 160MLA 4<br>Product Code: 3GAA162410-ADK                        |         |                |          |                      |       |      |    |
| Rating:                                                                                                                                        |             |           |       |                                                                            |         |                |          |                      |       |      |    |
|                                                                                                                                                |             |           |       | V                                                                          | Hz      | kW             | r/min    | A                    | cos φ | Duty |    |
| 3-Motor                                                                                                                                        |             |           |       | 690                                                                        | Y       | 50             | 11,0     | 1473                 | 11,8  | 0,84 | S1 |
| Insul.cl.F                                                                                                                                     |             |           |       | 400                                                                        | D       | 50             | 11,0     | 1473                 | 20,4  | 0,84 | S1 |
| IP55                                                                                                                                           |             |           |       | 660                                                                        | Y       | 50             | 11,0     | 1469                 | 12,5  | 0,85 | S1 |
|                                                                                                                                                |             |           |       | 380                                                                        | D       | 50             | 11,0     | 1469                 | 21,3  | 0,85 | S1 |
|                                                                                                                                                |             |           |       | 415                                                                        | D       | 50             | 11,0     | 1476                 | 19,9  | 0,83 | S1 |
|                                                                                                                                                |             |           |       | 460                                                                        | D       | 60             | 11,0     | 1777                 | 17,9  | 0,83 | S1 |
| Eff class IE3                                                                                                                                  |             |           |       | 50Hz : IE3 - 92,2(100%) - 93,0(75%) - 92,7(50%)<br>60Hz : IE3 - 92,7(100%) |         |                |          |                      |       |      |    |
| Resistance                                                                                                                                     |             |           |       | Insulation resistance at                                                   |         |                |          | Overload             |       |      |    |
| Line                                                                                                                                           |             |           |       | Ambient: 23,1 °C                                                           |         |                |          | R > 2000 Mohm 1000 V |       |      |    |
| U <sub>1</sub> - V <sub>1</sub>                                                                                                                |             |           |       | 0,4344 Ω                                                                   |         |                |          | Volt. 130 % 60s      |       |      |    |
| U <sub>1</sub> - W <sub>1</sub>                                                                                                                |             |           |       | 0,4303 Ω                                                                   |         |                |          | Curr. 160 % 120s     |       |      |    |
| V <sub>1</sub> - W <sub>1</sub>                                                                                                                |             |           |       | 0,4314 Ω                                                                   |         |                |          | Speed 120 % 120s     |       |      |    |
|                                                                                                                                                |             |           |       | High-voltage test winding                                                  |         |                |          | 2400 V 60 s          |       |      |    |
| Test                                                                                                                                           | Torque [Nm] | Line U[V] | f[Hz] | Input I[A]                                                                 | P1 [kW] | Output P2 [kW] | n[r/min] | cos φ                | η [%] |      |    |
| No load test                                                                                                                                   |             | 401,1 D   | 50    | 7,9                                                                        | 0,29    |                | 1500     | 0,05                 |       |      |    |
| Locked rotor test                                                                                                                              |             | 82,7 D    | 50    | 20,7                                                                       | 0,90    |                |          | 0,30                 |       |      |    |
| Thermal test ( 100% load )                                                                                                                     | 71,1        | 400 D     | 50    | 20,8                                                                       | 11,87   | 11,00          | 1477     | 0,83                 | 92,64 |      |    |
| Partial load points:                                                                                                                           |             |           |       |                                                                            |         |                |          |                      |       |      |    |
| ~75% load                                                                                                                                      | 53,1        | 400 D     | 50    | 16,4                                                                       | 8,86    | 8,25           | 1484     | 0,78                 | 93,13 |      |    |
| ~50% load                                                                                                                                      | 35,2        | 400 D     | 50    | 12,5                                                                       | 5,92    | 5,50           | 1491     | 0,69                 | 92,87 |      |    |
| ~25% load                                                                                                                                      | 17,5        | 400 D     | 50    | 9,4                                                                        | 3,07    | 2,75           | 1497     | 0,47                 | 89,62 |      |    |
| Temperature rise at rated load.                                                                                                                |             |           |       | [°C]                                                                       | [K]     | Method         |          | Measurement method   |       |      |    |
| Stator winding :                                                                                                                               |             |           |       |                                                                            | 40,3    | 1              |          | 1 Resistance         |       |      |    |
| Frame :                                                                                                                                        |             |           |       | 48                                                                         |         | 2              |          | 2 Thermometer        |       |      |    |
| Bearing D-end :                                                                                                                                |             |           |       | 49                                                                         |         | 2              |          | 3 Thermocouples      |       |      |    |
| Ambient Temperature :                                                                                                                          |             |           |       | 22                                                                         |         | 2              |          |                      |       |      |    |
| These tests have been carried out on motor no. 3GV13 11256323 001 , on date 2013-10-24 which is identical in electrical design with the above. |             |           |       |                                                                            |         |                |          |                      |       |      |    |
| Manufactured and tested in accordance with rules of IEC 60034-1 and IEC 60034-2-1.<br>PLL determined from residual loss.                       |             |           |       |                                                                            |         |                |          |                      |       |      |    |
| On behalf of customer                                                                                                                          |             |           |       |                                                                            |         |                |          |                      |       |      |    |
| On behalf of manufacturer Date of test                                                                                                         |             |           |       |                                                                            |         |                |          |                      |       |      |    |
| Tested by ABB AB, LV Motors, 721 70 Västerås, Sweden                                                                                           |             |           |       |                                                                            |         |                |          |                      |       |      |    |
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