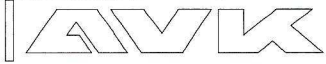


|                                                                                   |                       |                                                                                        |                                                |                                 |         |           |
|-----------------------------------------------------------------------------------|-----------------------|----------------------------------------------------------------------------------------|------------------------------------------------|---------------------------------|---------|-----------|
|  |                       | Technische Daten / technical data                                                      |                                                | DIG                             | 150     | m/6       |
| Nennndaten / nominal data                                                         |                       |                                                                                        |                                                |                                 |         |           |
| Leistung S <sub>N</sub> : 4048 kVA                                                |                       | COS φ:                                                                                 |                                                | 0,90                            |         |           |
| rating power                                                                      |                       | p.f.                                                                                   |                                                |                                 |         |           |
| Spannung U <sub>N</sub> : 6300 V                                                  |                       | Strom I <sub>N</sub> :                                                                 |                                                | 371 A                           |         |           |
| voltage                                                                           |                       | current                                                                                |                                                |                                 |         |           |
| Frequenz f: 50 /s                                                                 |                       | 6 polig                                                                                |                                                | Drehzahl n:                     |         | 1000 /min |
| frequency                                                                         |                       | poles                                                                                  |                                                | speed                           |         |           |
| Reaktanzen und Zeitkonstanten / reactances and time constants                     |                       |                                                                                        |                                                |                                 |         |           |
| x <sub>d</sub> :                                                                  | 1,47 p.u.             | x <sub>q</sub> :                                                                       | 0,74 p.u.                                      | T <sub>d0</sub> '               | 3,10 s  |           |
| x <sub>d</sub> '                                                                  | 0,221 p.u.            | x <sub>q</sub> '                                                                       | 0,74 p.u.                                      | T <sub>d</sub> '                | 0,47 s  |           |
| x <sub>d</sub> ''                                                                 | 0,147 p.u.            | x <sub>q</sub> ''                                                                      | 0,162 p.u.                                     | T <sub>d</sub> ''               | 0,020 s |           |
| x <sub>2</sub> :                                                                  | 0,154 p.u.            | x <sub>0</sub> :                                                                       | 0,044 p.u.                                     | T <sub>a</sub> :                | 0,080 s |           |
| Wirkungsgrad / efficiency                                                         |                       |                                                                                        |                                                |                                 |         |           |
|                                                                                   | 1/4*P <sub>N</sub>    | 2/4*P <sub>N</sub>                                                                     | 3/4*P <sub>N</sub>                             | 4/4*P <sub>N</sub>              |         |           |
| η [%] p.f.=0.8                                                                    | 94,18                 | 96,26                                                                                  | 96,96                                          | 97,00                           |         |           |
| η [%] p.f.=0.85                                                                   | 94,24                 | 96,39                                                                                  | 97,14                                          | 97,21                           |         |           |
| η [%] p.f.=0.9                                                                    | 94,30                 | 96,51                                                                                  | 97,31                                          | 97,42                           |         |           |
| η [%] p.f.=1.0                                                                    | 94,41                 | 96,76                                                                                  | 97,66                                          | 97,83                           |         |           |
| Kurzschlußdaten / short circuit data                                              |                       |                                                                                        |                                                |                                 |         |           |
| I <sub>k</sub> ''                                                                 | 2524 A                | Anfangskurzschlußwechselstrom (3~) / initial short circuit current (3~)                |                                                |                                 |         | p.u. 6,80 |
| i <sub>S</sub> :                                                                  | 6423 A                | Stoßkurzschlußstrom (3~) / max. peak current (3~)                                      |                                                |                                 |         | 17,31     |
| I <sub>k</sub> :                                                                  | 1113 A                | Dauerkurzschlußstrom (3~) / sustained short circuit current (3~)                       |                                                |                                 |         | 3,00      |
| M <sub>k2</sub> :                                                                 | 341,8 kNm             | Stoßkurzschlußmoment (2~) / initial short circuit torque (2~)                          |                                                |                                 |         | 8,84      |
| M <sub>f</sub> :                                                                  | 735,0 kNm             | Max.Fehlsynchronisationsmoment / max. faulty synchron.torque                           |                                                |                                 |         | 19,01     |
| M <sub>SN</sub> :                                                                 | 38,66 kNm             | Nennscheinmoment / rated kVA torque=                                                   |                                                |                                 |         | 1,00      |
| M <sub>N</sub> :                                                                  | 34,79 kNm             | Nennmoment / rated torque                                                              |                                                |                                 |         | 0,90      |
| dU'                                                                               | -18,1 %               | Transienter Spannungseinbruch bei Nennlaststoß / TVD at rated load application         |                                                |                                 |         |           |
| dS <sub>max.</sub> <=                                                             | 2748 kVA              | Max. Laststoß bei p.f.0.2 mit dU'<=15% / Max. load application at p.f.0.2 for TVD<=15% |                                                |                                 |         |           |
| Sonstige Daten / other data                                                       |                       |                                                                                        |                                                |                                 |         |           |
| Trägheitsmoment J:                                                                | 440 kgm <sup>2</sup>  | *                                                                                      | Gewicht m:                                     | 13800 kg*                       |         |           |
| moment of inertia                                                                 |                       |                                                                                        | weight                                         |                                 |         |           |
| Kühlluftmenge Q <sub>L</sub> :                                                    | 3,5 m <sup>3</sup> /s |                                                                                        | Kühlmitteltemp.:                               | 40 °C                           |         |           |
| cooling air volume                                                                |                       |                                                                                        | cooling medium temp                            |                                 |         |           |
| Schutzart:                                                                        | 23,0                  |                                                                                        | Isolationsklasse:                              | F                               |         |           |
| enclosure                                                                         |                       |                                                                                        | insulation class                               |                                 |         |           |
| Bemerkungen / remarks                                                             |                       |                                                                                        |                                                |                                 |         |           |
| AvK No.: 83 28084 A001                                                            |                       |                                                                                        |                                                | *exact values see valid drawing |         |           |
| Temperature rise according to F                                                   |                       |                                                                                        |                                                |                                 |         |           |
| Voltage/Frequency range according to EN60034-1,zone A                             |                       |                                                                                        |                                                |                                 |         |           |
| 13.06.06 Ja                                                                       |                       |                                                                                        |                                                |                                 |         |           |
| Alle Angaben sind gemäß VDE 0530, IEC 34                                          |                       |                                                                                        | All data are in accordance to VDE 0530, IEC 34 |                                 |         |           |



Prüfprotokoll für selbstregelnden Drehstrom-Synchrongenerator  
test report for self regulating three phase alternator

1.1  
Rev.3

|       |           |        |             |            |             |
|-------|-----------|--------|-------------|------------|-------------|
| Type: | DIG150m/6 | Order: | 8328084A001 | Masch.Nr.: | 8328084A101 |
|-------|-----------|--------|-------------|------------|-------------|

|                                       |          |                                          |           |                                   |               |
|---------------------------------------|----------|------------------------------------------|-----------|-----------------------------------|---------------|
| Leistung:<br>rating power             | 4048 kVA | Spannung:<br>voltage                     | 6300 V Y  | Drehrichtung:<br>rotation         | links / left  |
| Strom:<br>current                     | 371 A    | cos $\varphi$ :<br>p.f.                  | 0,9       | Erregung:<br>excitation           | 40 V / 3,4 A  |
| Frequenz:<br>frequency                | 50 Hz    | Drehzahl:<br>speed                       | 1000 /min | Hilfserregung:<br>aux. excitation | 115 V / 50 Hz |
| Isolationsklasse:<br>insulation class | F        | Kühlmitteltemp.:<br>cooling medium temp. | 40 °C     |                                   |               |

|                                            |          |                                           |                  |                                |            |
|--------------------------------------------|----------|-------------------------------------------|------------------|--------------------------------|------------|
| Beschriftung:<br>inscription               | D/E      | Spezifikation:<br>specification           | VDE0530 - IEC034 | Schaltbild:<br>circuit diagram | K850.0.116 |
| Aufstellungshöhe:<br>installation altitude | 1000 m   | Sollwertsteller:<br>voltage sett.rheostat |                  | Nettogewicht:<br>net weight    | - kg       |
| Parallelbetrieb:<br>parallel operation     | ja / yes | cos $\varphi$ -Steller:<br>p.f. adjuster  | - $\Omega$       | Schutzklasse:<br>enclosure     | IP23       |
| Funkstörgrad:<br>interference suppr. grade | N        | Bauform:<br>form                          | B20              |                                |            |

Dauerlauf / heat run

| t | S   | U <sub>U-V</sub> | I | cos $\varphi$ | Temp.anstieg / temp. rise      |                               |
|---|-----|------------------|---|---------------|--------------------------------|-------------------------------|
| h | kVA | V                | A |               | $\Delta\theta_{\text{Stator}}$ | $\Delta\theta_{\text{Rotor}}$ |
|   |     |                  |   |               |                                |                               |

Wicklungen / windings

|                              |                                | Wicklungsprüfung<br>winding test | Isolationsprüfung<br>insulation test | Widerstandsmessung<br>resistance measurement | Umgebungstemp.<br>ambient temperature |
|------------------------------|--------------------------------|----------------------------------|--------------------------------------|----------------------------------------------|---------------------------------------|
|                              |                                | 1 min                            | 5 kV 1 min                           |                                              | 23 °C                                 |
| Stator / stator              | U <sub>1</sub> -U <sub>2</sub> | 13,6 kV                          | 15200 M $\Omega$                     | 0,0531 $\Omega$                              |                                       |
|                              | V <sub>1</sub> -V <sub>2</sub> | 13,6 kV                          | 15200 M $\Omega$                     | 0,0530 $\Omega$                              |                                       |
|                              | W <sub>1</sub> -W <sub>2</sub> | 13,6 kV                          | 15200 M $\Omega$                     | 0,0531 $\Omega$                              |                                       |
| Rotor / rotor                | I-K                            | 2,0 kV                           | > 400 M $\Omega$                     | 1,2000 $\Omega$                              |                                       |
|                              | U-V                            | 2,0 kV                           | > 400 M $\Omega$                     | 0,0615 $\Omega$                              |                                       |
| Erreger<br>exciter           | I <sub>1</sub> -K <sub>1</sub> | 2,0 kV                           | > 400 M $\Omega$                     | 10,4000 $\Omega$                             |                                       |
| Hilfserreger<br>aux. exciter | I <sub>2</sub> -K <sub>2</sub> | - kV                             | - M $\Omega$                         | - $\Omega$                                   |                                       |
|                              | U <sub>H1-2</sub>              | 2,0 kV                           | > 400 M $\Omega$                     | 0,1597 $\Omega$                              |                                       |
|                              | W <sub>H1-2</sub>              | 2,0 kV                           | > 400 M $\Omega$                     | 0,1568 $\Omega$                              |                                       |
|                              | U <sub>H1-3</sub>              | - kV                             | - M $\Omega$                         | - $\Omega$                                   |                                       |
|                              | U <sub>H3-4</sub>              | - kV                             | - M $\Omega$                         | - $\Omega$                                   |                                       |
|                              | W <sub>H3-4</sub>              | - kV                             | - M $\Omega$                         | - $\Omega$                                   |                                       |
| Bifilarwicklung              |                                | - kV                             | - M $\Omega$                         | - $\Omega$                                   |                                       |

|                                       |                                |                                   |        |                                    |      |
|---------------------------------------|--------------------------------|-----------------------------------|--------|------------------------------------|------|
| Schleuderprobe:<br>overspeed test     | 1200 /min<br>(2min)            | Remanenzspg.:<br>remanent voltage | 1052 V | 50 % Überlast für:<br>overload for | 30 s |
| Windungsprobe:<br>winding test        | 8205 V<br>(2min)               | Lagergeräusch:<br>bearing noise   | normal |                                    |      |
| Spannungsunsym.:<br>voltage unbalance | < 18 V<br>(Leerlauf / no load) | Drehfeld:<br>field rotation       | W-V-U  |                                    |      |

AvK  
Deutschland GmbH & Co.KG  
Bunsenstr. 17 D-85053 Ingoalstadt

Datum / date:  
15.01.07

Prüfer / tester:  
Neubauer

Kontrolle TBR / controll TBR:  
Maximov

|            |             |
|------------|-------------|
| Masch.Nr.: | 8328084A101 |
|------------|-------------|

Kontrolle TBR / controll TBR:

|  |  |                                                                                                                                       |  |                           |  |  |                               |  |  |                                    |  |
|--|--|---------------------------------------------------------------------------------------------------------------------------------------|--|---------------------------|--|--|-------------------------------|--|--|------------------------------------|--|
|  |  | <b>Prüfprotokoll für selbstregelnden Drehstrom-Synchrongenerator</b><br><b>test report for self regulating three phase alternator</b> |  |                           |  |  |                               |  |  | <b>3.1</b><br><small>Rev.3</small> |  |
|  |  | Type: <b>DIG150m/6</b>                                                                                                                |  | Order: <b>8328084A001</b> |  |  | Masch.Nr.: <b>8328084A101</b> |  |  |                                    |  |

| <b>Leerlaufkennlinie / no load characteristic</b> |                |            |               |                  |           |                 |                 |                  |                 |                 | $R_{LK}: 1,2240 \Omega$ |  |
|---------------------------------------------------|----------------|------------|---------------|------------------|-----------|-----------------|-----------------|------------------|-----------------|-----------------|-------------------------|--|
| $U / U_N$                                         | $U_{U-V}$<br>V | $I_K$<br>A | $U_{IK}$<br>V | $I_{II-K1}$<br>A | n<br>/min | $U_{Mot.}$<br>V | $I_{Mot.}$<br>A | $P_{Mot.}$<br>kW | $U_{HI-2}$<br>V | $W_{HI-2}$<br>V |                         |  |
| 1,30                                              | 8205           | 90         | 110,3         | 2,9              | 1000      | -415            | -327            | 135,5            | 164             | 163             |                         |  |
| 1,20                                              | 7563           | 66         | 80,9          | 2,0              | 1000      | -424            | -223            | 94,6             | 150             | 150             |                         |  |
| 1,10                                              | 6930           | 51         | 63,0          | 1,5              | 1000      | -432            | -165            | 71,2             | 138             | 137             |                         |  |
| 1,00                                              | 6300           | 42         | 51,9          | 1,2              | 1000      | -461            | -123            | 56,5             | 125             | 124             |                         |  |
| 0,90                                              | 5671           | 36         | 44,3          | 1,0              | 1000      | -463            | -103            | 47,7             | 112             | 112             |                         |  |
| 0,80                                              | 5043           | 31         | 38,4          | 0,9              | 1000      | -519            | -86             | 44,8             | 100             | 100             |                         |  |
| 0,60                                              | 3771           | 22         | 27,3          | 0,6              | 1000      | -487            | -70             | 34,3             | 75              | 74              |                         |  |
| 0,40                                              | 2505           | 15         | 17,8          | 0,3              | 1000      | -435            | -69             | 30,2             | 49              | 49              |                         |  |
| 0,17                                              | 1052           | 6          | 7,0           | 0,0              | 1000      | -447            | -58             | 25,8             | 20              | 20              |                         |  |

| <b>Kurzschlußkennlinie / short circuit characteristic</b> |        |            |               |                  |           |                 |                 |                  |                 |                 | $R_{U1-U2}: 0,0563 \Omega$ |  | $R_{LK}: 1,2320 \Omega$ |  |
|-----------------------------------------------------------|--------|------------|---------------|------------------|-----------|-----------------|-----------------|------------------|-----------------|-----------------|----------------------------|--|-------------------------|--|
| $I / I_N$                                                 | I<br>A | $I_K$<br>A | $U_{IK}$<br>V | $I_{II-K1}$<br>A | n<br>/min | $U_{Mot.}$<br>V | $I_{Mot.}$<br>A | $P_{Mot.}$<br>kW | $U_{HI-2}$<br>V | $W_{HI-2}$<br>V |                            |  |                         |  |
| 1,50                                                      | 556    | 92         | 113,7         | 2,9              | 1000      | -452            | -239            | 108,0            | 99              | 98              |                            |  |                         |  |
| 1,25                                                      | 464    | 77         | 94,9          | 2,3              | 1000      | -429            | -196            | 83,9             | 85              | 84              |                            |  |                         |  |
| 1,00                                                      | 370    | 62         | 75,8          | 1,8              | 1000      | -448            | -147            | 65,8             | 70              | 68              |                            |  |                         |  |
| 0,75                                                      | 278    | 46         | 56,8          | 1,3              | 1000      | -650            | -69             | 44,7             | 53              | 52              |                            |  |                         |  |
| 0,50                                                      | 186    | 31         | 38,0          | 0,8              | 1000      | -499            | -70             | 34,9             | 35              | 35              |                            |  |                         |  |

| <b>Dauerkurzschluß / sustained short circuit</b> |        |            |               |                  |           |  |  |  |  |  |  |
|--------------------------------------------------|--------|------------|---------------|------------------|-----------|--|--|--|--|--|--|
| $I / I_N$                                        | I<br>A | $I_K$<br>A | $U_{IK}$<br>V | $I_{II-K1}$<br>A | n<br>/min |  |  |  |  |  |  |
| 4,0                                              | 1482,0 | 264,6      | 326           | 8,9              | 998       |  |  |  |  |  |  |

| <b>Lastkennlinie bei <math>\cos\phi=0.1</math> / load characteristic at p.f.=0.1</b> |                |        |               |                  |                  |           |                 |                 |                  |                 | $R_{LK}: 1,2540 \Omega$ |  |
|--------------------------------------------------------------------------------------|----------------|--------|---------------|------------------|------------------|-----------|-----------------|-----------------|------------------|-----------------|-------------------------|--|
| $I / I_N$                                                                            | $U_{U-V}$<br>V | I<br>A | $U_{IK}$<br>V | $I_{II-K1}$<br>A | $U_{I2-K2}$<br>V | n<br>/min | $U_{Mot.}$<br>V | $I_{Mot.}$<br>A | $P_{Mot.}$<br>kW | $U_{HI-2}$<br>V | $W_{HI-2}$<br>V         |  |
| -                                                                                    | 6309           | -      | 53,5          | 1,2              |                  | 1004      | -410            | -139            | 57,1             | 125             | 125<br>129              |  |
| 0,41                                                                                 | 6311           | 150    | 90,5          | 2,2              |                  | 1001      | -426            | -350            | 149,2            | 128             | 129                     |  |

| <b>Spannungsstellbereich / voltage adjustment range</b> |                |        |               |                  |                  |           | <b>Statikeinstellung / static drop adjustment</b> |        |             |           |  |
|---------------------------------------------------------|----------------|--------|---------------|------------------|------------------|-----------|---------------------------------------------------|--------|-------------|-----------|--|
| $R_1$<br>$\Omega$                                       | $U_{U-V}$<br>V | I<br>A | $U_{IK}$<br>V | $I_{II-K1}$<br>A | $U_{I2-K2}$<br>V | n<br>/min | $U_{U-V}$<br>V                                    | I<br>A | $\cos \phi$ | n<br>/min |  |
|                                                         | 6937           | -      | 64,5          | 1,6              |                  | 1004      |                                                   |        |             |           |  |
|                                                         | 5671           | -      | 44,2          | 1,0              |                  | 1004      |                                                   |        |             |           |  |

|                                                                                                  |                                     |                                                     |  |
|--------------------------------------------------------------------------------------------------|-------------------------------------|-----------------------------------------------------|--|
| Reglersystem / AVR system: <b>UNITROL 1000</b>                                                   |                                     | Reglersicherungen / AVR fuses: <b>A</b>             |  |
| R21 eingestellt auf / adjusted to: <b>- <math>\Omega</math></b>                                  |                                     | Meßtransf. T24 sek. / measuring transf.: <b>- V</b> |  |
| Unterdrehzahlschutz eingestellt: <b>47,5 Hz</b><br><small>underspeed protection adjusted</small> |                                     | Erregungszeit / excitation time: <b>13 s</b>        |  |
| Modul<br><b>UNITROL 1000</b>                                                                     | Serien-Nr.:<br><b>30094854 0016</b> | Bemerkung / remark<br><b>eingestellt</b>            |  |

|                                                                                                       |  |                                  |  |                                     |  |                                                |  |
|-------------------------------------------------------------------------------------------------------|--|----------------------------------|--|-------------------------------------|--|------------------------------------------------|--|
| <b>AvK</b><br><b>Deutschland GmbH &amp; Co.KG</b><br><small>Bunsenstraße 17 D-85053 InnoStadt</small> |  | Datum / date:<br><b>15.01.07</b> |  | Prüfer / tester:<br><b>Neubauer</b> |  | Kontrolle TBR / control TBR:<br><b>Maximov</b> |  |
|-------------------------------------------------------------------------------------------------------|--|----------------------------------|--|-------------------------------------|--|------------------------------------------------|--|