

TECHNICAL DATA SHEET



**ALTERNATOR PRO28S B/4**

*Three-Phase brushless synchronous alternator with AVR - 4 poles*

## PRO28S B/4

### COMMON DATA

|                      |                     |  |            |
|----------------------|---------------------|--|------------|
| Rated Power at 50Hz  | kVA                 | 200  |            |
| Rated Power at 60Hz  | kVA                 | 240  |            |
| Rated Power Factor   |                     | 0,8  |            |
| Nominal Temperature  | °C                  | 40   |            |
| Control System       |                     | self-excited   |            |
| Execution            |                     | brushless  |            |
| Regulation Type      |                     | AVR  |            |
| Insulation Class     |                     | H  |            |
| Protection           |                     | IP23   |            |
| Maximum Over speed   | rpm                 | 2250   |            |
| Overload             |                     | 110% of rated power for one hour in a cycle of 6 hours |            |
| Air Flow Requirement | m <sup>3</sup> /min | 32 at 50Hz   | 38 at 60Hz |
| R.F.I. Suppression   |                     | Standard EN55011                                       |            |

### REGULATION DATA

|                         |  |                         |
|-------------------------|--|-------------------------|
| AVR                     |  | HVR30                   |
| Sensing                 |  | three-phase             |
| Voltage Regulation      |  | ±1%                     |
| Sustained Short Circuit |  | > 300% of rated current |

### WINDING DATA

|                           |     |                                     |  |
|---------------------------|-----|-------------------------------------|--|
| Stator Winding            |     | Double layer with auxiliary winding |  |
| Rotor Winding             |     | with damping cage                   |  |
| Winding Pitch             |     | 2/3                                 |  |
| Number of Leads of Stator |     | 12                                  |  |
| Stator Winding Resistance | Ω   | 0,011 at 20°C                       |  |
| Rotor Winding Resistance  | Ω   | 1,9 at 20°C                         |  |
| Exciter Stator Resistance | Ω   | 15 at 20°C                          |  |
| Exciter Rotor Resistance  | Ω   | 0,25 at 20°C                        |  |
| THD at full load          |     | <3%                                 |  |
| THD at no load            |     | <3%                                 |  |
| Excitation at no load     | Adc | 0,63                                |  |
| Excitation at full load   | Adc | 2,4                                 |  |

### STANDARD

|            |                             |
|------------|-----------------------------|
| References | EN60034-1 ISO8528-3 EN55011 |
|------------|-----------------------------|

### ON REQUEST

UL 1446, Systems of Insulating Materials - General CSA-C22.2 No. 0, Appendix B, General Requirements - Canadian Electrical Code, Part I

## PRO28S B/4

### ELECTRICAL DATA

| Frequency                           |     | 50Hz - 1500rpm |                                  |                    |                    |                    | 60Hz - 1800rpm                   |                    |                    |                    |                    |
|-------------------------------------|-----|----------------|----------------------------------|--------------------|--------------------|--------------------|----------------------------------|--------------------|--------------------|--------------------|--------------------|
| Voltage                             | V   | Double Delta   | Series High Wye Parallel Low Wye |                    |                    | Double Delta       | Series High Wye Parallel Low Wye |                    |                    |                    |                    |
|                                     |     | 115/230        | 380/220<br>190/110               | 400/230<br>200/115 | 415/240<br>208/120 | 440/254<br>220/127 | 138/277                          | 415/240<br>208/120 | 440/254<br>220/127 | 460/266<br>230/133 | 480/277<br>240/154 |
| Rated Power in Class H (125°C/40°C) | kVA | 130            | 200                              | 200                | 200                | 180                | 156                              | 225                | 240                | 240                | 240                |
|                                     | kW  | 104            | 160                              | 160                | 160                | 144                | 124,8                            | 180                | 192                | 192                | 192                |
| Rated Power in Class F (105°C/40°C) | kVA | 114            | 175                              | 175                | 175                | 160                | 137                              | 200                | 210                | 210                | 210                |
|                                     | kW  | 91,2           | 140                              | 140                | 140                | 128                | 109,6                            | 160                | 168                | 168                | 168                |
| Rated Power Standby (150°C/40°C)    | kVA | 140            | 215                              | 215                | 215                | 195                | 170                              | 245                | 260                | 260                | 260                |
|                                     | kW  | 112            | 172                              | 172                | 172                | 156                | 136                              | 196                | 208                | 208                | 208                |
| Rated Power Standby (163°C/27°C)    | kVA | 143            | 220                              | 220                | 220                | 200                | 172                              | 250                | 265                | 265                | 265                |
|                                     | kW  | 114,4          | 176                              | 176                | 176                | 160                | 137,6                            | 200                | 212                | 212                | 212                |

### EFFICIENCY IN CL. H

|     |  |  |       |  |  |  |  |  |  |       |
|-----|--|--|-------|--|--|--|--|--|--|-------|
| 4/4 |  |  | 91,7% |  |  |  |  |  |  | 92,5% |
| 3/4 |  |  | 92,3% |  |  |  |  |  |  | 93,1% |
| 2/4 |  |  | 90,8% |  |  |  |  |  |  | 91,6% |
| 1/4 |  |  | 88,7% |  |  |  |  |  |  | 89,5% |

### REACTANCES AND TIME CONSTANTS

|                  |                               |       |       |       |       |  |        |       |       |       |
|------------------|-------------------------------|-------|-------|-------|-------|--|--------|-------|-------|-------|
| pcc              |                               | 0,34  |       |       |       |  |        |       |       |       |
| X <sub>d</sub>   | - dir. axis synchronous       | 431%  | 389%  | 361%  | 289%  |  | 488%   | 463%  | 424%  | 389%  |
| X' <sub>d</sub>  | - dir. axis transient         | 23,3% | 21,0% | 19,5% | 15,6% |  | 26,3%  | 25,0% | 22,9% | 21,0% |
| X'' <sub>d</sub> | - dir. axis subtransient      | 12,3% | 11,1% | 10,3% | 8,3%  |  | 13,9%  | 13,2% | 12,1% | 11,1% |
| X <sub>q</sub>   | - quad. axis reactance        | 265%  | 239%  | 222%  | 178%  |  | 300%   | 284%  | 260%  | 239%  |
| T' <sub>do</sub> | - O.C. field time constant    |       |       |       |       |  | 1810ms |       |       |       |
| T' <sub>d</sub>  | - Transient time constant     |       |       |       |       |  | 113ms  |       |       |       |
| T'' <sub>d</sub> | - Sub-transient time constant |       |       |       |       |  | 17ms   |       |       |       |

### MECHANICAL DATA

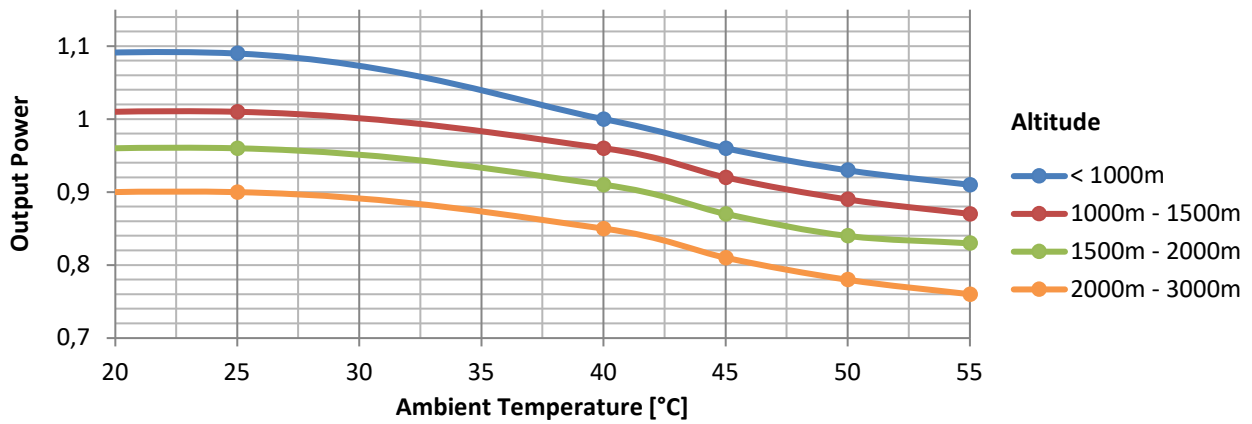
|                                 |           |    |  |             |
|---------------------------------|-----------|----|--|-------------|
| Bearing non drive end           |           |    |  | 6314-2RS-C3 |
| Bearing drive end (B3/B14 form) |           |    |  | 6316-2RS-C3 |
| Weight of generator             | in B2     | kg |  | 591         |
|                                 | in B3/B14 | kg |  | 602         |
|                                 | in B3/B9  | kg |  | \           |

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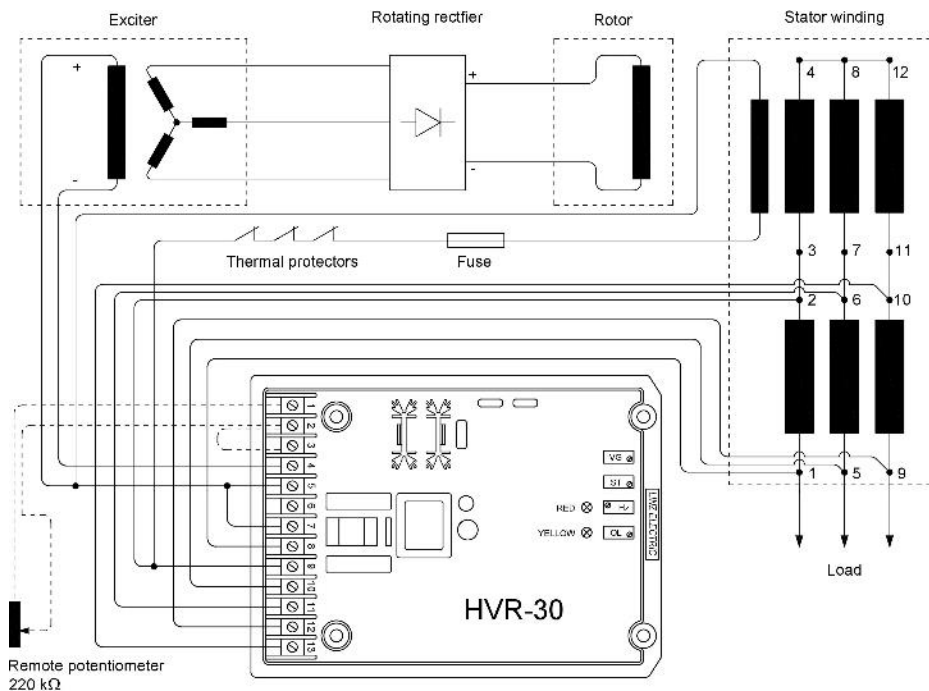
## MOMENT OF INERZIA

|         |                   |       |
|---------|-------------------|-------|
| B3/B9   | kg·m <sup>2</sup> | \     |
| SAE 7½  | kg·m <sup>2</sup> | \     |
| SAE 8   | kg·m <sup>2</sup> | \     |
| SAE 10  | kg·m <sup>2</sup> | \     |
| SAE 11½ | kg·m <sup>2</sup> | 2,445 |
| SAE 14  | kg·m <sup>2</sup> | 2,56  |
| SAE 18  | kg·m <sup>2</sup> | \     |
| B3/B14  | kg·m <sup>2</sup> | 2,265 |

## DERATING CURVES



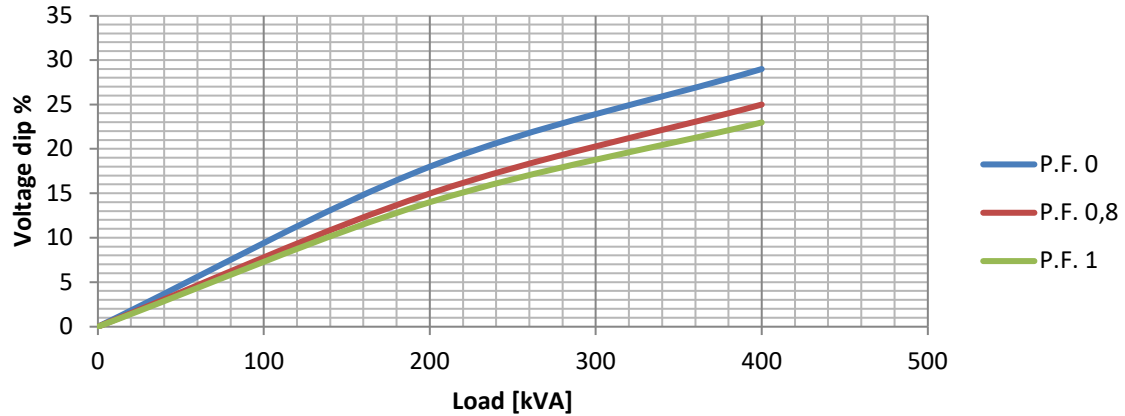
## WIRING DIAGRAM



## PRO28S B/4

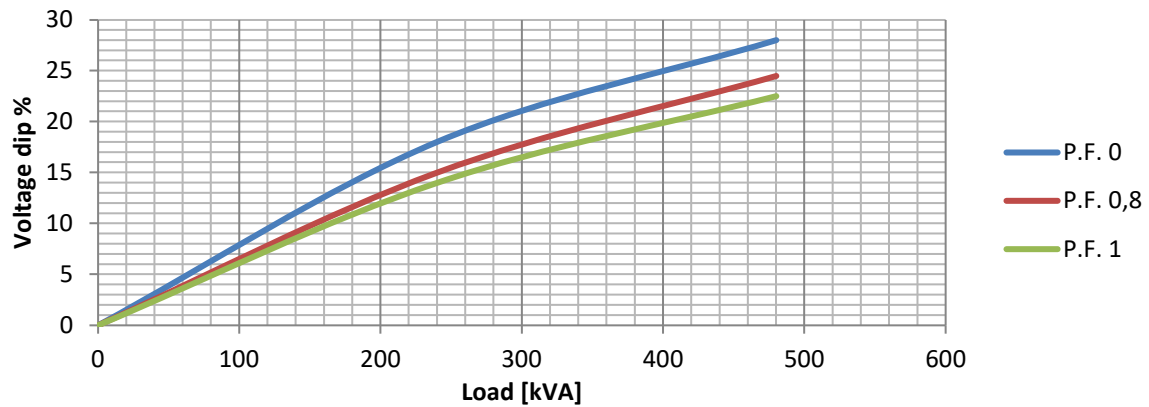
### TRANSIENT VOLTAGE VARIATION 50Hz

#### Transient Voltage Variation @ 50Hz



### TRANSIENT VOLTAGE VARIATION 60Hz

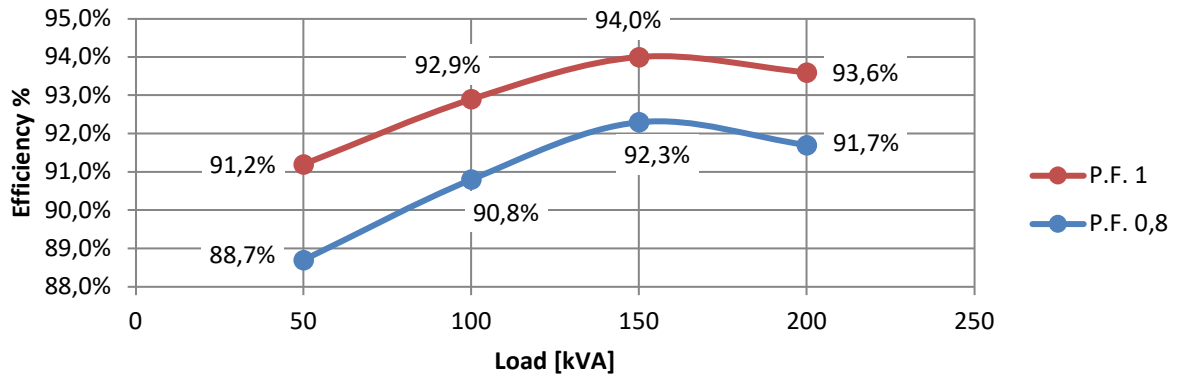
#### Transient Voltage Variation @ 60Hz



# PRO28S B/4

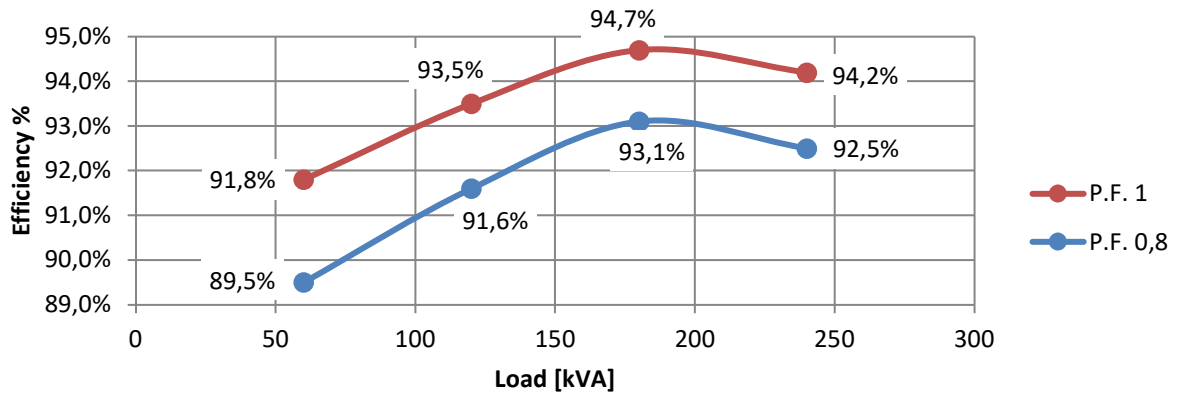
## EFFICIENCY 50Hz

### Efficiency Curves @ 50Hz



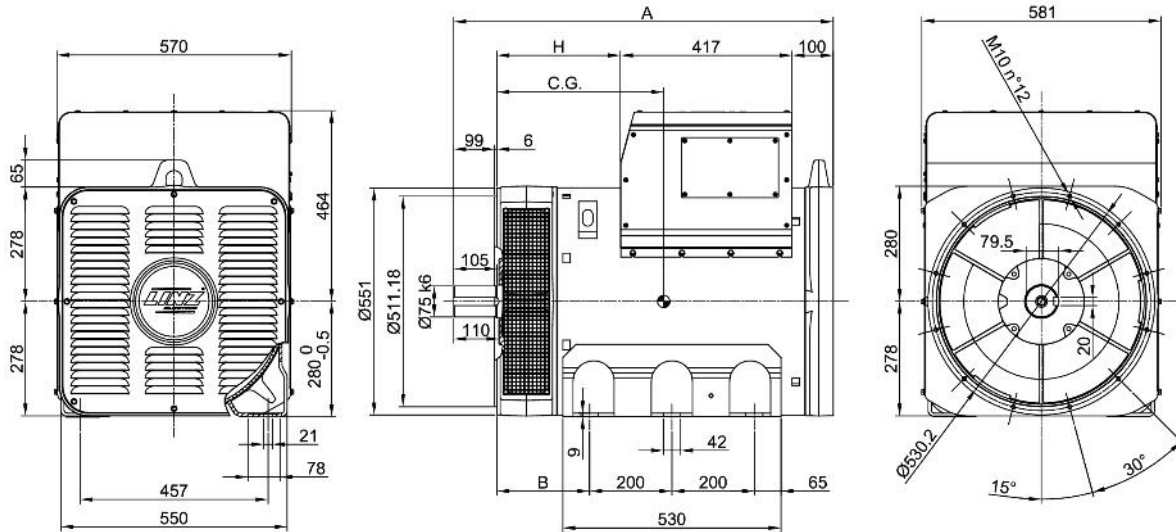
## EFFICIENCY 60Hz

### Efficiency Curves @ 60Hz

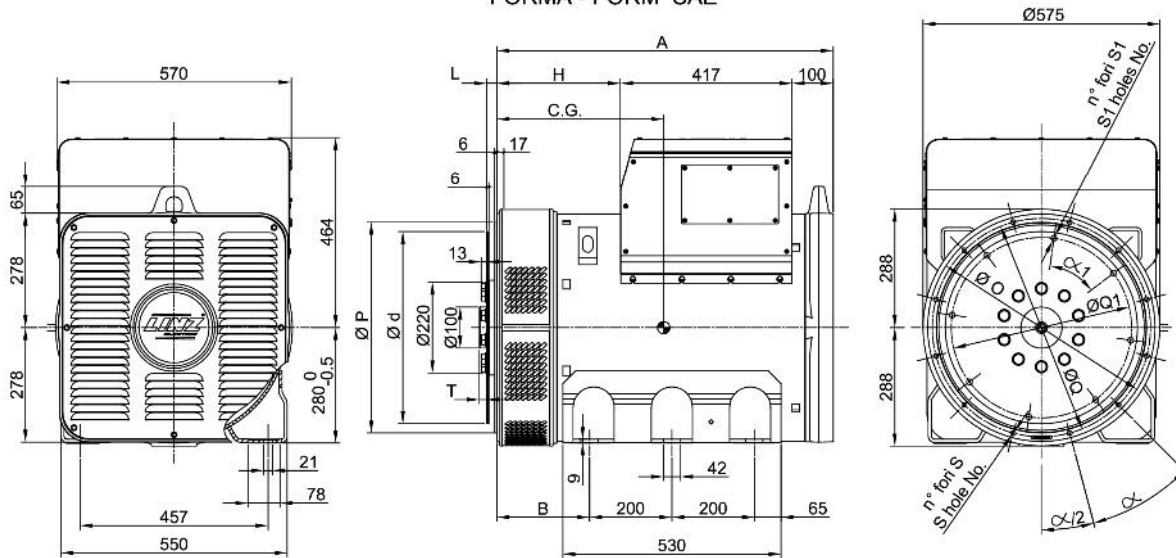


# PRO28S B/4

FORMA - FORM B3/B14



FORMA - FORM SAE



| FORMA - FORM |         | A    | B   | H   |
|--------------|---------|------|-----|-----|
| B3/B14       | PRO 28S | 922  | 225 | 300 |
|              | PRO 28M | 1072 |     | 450 |
|              | PRO 28L | 1137 | 325 | 515 |
| SAE          | PRO 28S | 817  | 225 | 300 |
|              | PRO 28M | 967  |     | 450 |
|              | PRO 28L | 1032 | 325 | 515 |

| TIPO - TYPE | C.G. |
|-------------|------|
| PRO28S A/4  | 376  |
| PRO28S B/4  | 380  |
| PRO28S C/4  | 394  |
| PRO28S D/4  | 406  |
| PRO28M E/4  | 452  |
| PRO28M F/4  | 480  |
| PRO28L G/4  | 513  |

| SAE N. | FLANGIE - FLANGES - BRIDAS |        |       |                   |    |     |
|--------|----------------------------|--------|-------|-------------------|----|-----|
|        | Ø O                        | Ø P    | Ø Q   | n. fori holes No. | S  | α   |
| 3      | 451                        | 409.6  | 428.6 | 12                | 12 | 30° |
| 2      | 490                        | 447.68 | 466.7 |                   |    |     |
| 1      | 552                        | 511.18 | 530.2 |                   |    |     |

| SAE N. | GIUNTI A DISCO - COUPLING DISCS - JUNTAS A DISCOS |        |        |                   |      |     |      |
|--------|---|--------|--------|-------------------|------|-----|------|
|        | L   | Ø d    | Ø Q1   | n. fori holes No. | S1   | α1  | T    |
| 11 1/2 | 39.6  | 352.42 | 333.37 | 8                 | 10.5 | 45° | 0    |
| 14     | 25.4  | 466.72 | 438.15 | 8                 | 14   | 45° | 17.3 |