

TECHNICAL DATA SHEET



ALTERNATOR PRO28S A/4

Three-Phase brushless synchronous alternator with AVR - 4 poles

PRO28S A/4

COMMON DATA

| | | |
|----------------------|---------------------|--|
| Rated Power at 50Hz | kVA | 180 |
| Rated Power at 60Hz | kVA | 215 |
| 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 ³ /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 | 0,0143 at 20°C |
| Rotor Winding Resistance | Ω | 1,7 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 | <2,5% | |
| Excitation at no load | A _{dc} | 0,56 |
| Excitation at full load | A _{dc} | 2,5 |

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

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ELECTRICAL DATA

| Frequency | | 50Hz - 1500rpm | | | | 60Hz - 1800rpm | | | |
|--|-----|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Voltage Series Star | V | 380/220 | 400/230 | 415/240 | 440/254 | 415/240 | 440/254 | 460/266 | 480/277 |
| Rated Power in Class H (125°C/40°C) | kVA | 180 | 180 | 175 | 165 | 196 | 205 | 215 | 215 |
| | kW | 144 | 144 | 140 | 132 | 156,8 | 164 | 172 | 172 |
| Rated Power in Class F (105°C/40°C) | kVA | 160 | 160 | 150 | 145 | 175 | 183 | 192 | 192 |
| | kW | 128 | 128 | 120 | 116 | 140 | 146,4 | 153,6 | 153,6 |
| Rated Power Standby (150°C/40°C) | kVA | 195 | 195 | 190 | 177 | 213 | 223 | 234 | 234 |
| | kW | 156 | 156 | 152 | 141,6 | 170,4 | 178 | 187,2 | 187,2 |
| Rated Power Standby (163°C/27°C) | kVA | 200 | 200 | 195 | 182 | 218 | 228 | 240 | 240 |
| | kW | 160 | 160 | 156 | 145,6 | 174,4 | 182,4 | 192 | 192 |

EFFICIENCY IN CL. H

| | | | | | | | | |
|-----|-------|--|--|--|--|--|--|-------|
| 4/4 | 91,8% | | | | | | | 92,5% |
| 3/4 | 92,2% | | | | | | | 92,7% |
| 2/4 | 91,0% | | | | | | | 91,7% |
| 1/4 | 89,0% | | | | | | | 89,8% |

REACTANCES AND TIME CONSTANTS

| | | | | | | | | | |
|--|--|--------|-------|-------|-------|-------|-------|-------|-------|
| pcc | | 0,32 | | | | | | | |
| X _d - dir. axis synchronous | | 399% | 360% | 325% | 273% | 439% | 409% | 392% | 360% |
| X' _d - dir. axis transient | | 21,1% | 19,0% | 17,2% | 14,4% | 23,2% | 21,6% | 20,7% | 19,0% |
| X'' _d - dir. axis subtransient | | 11,1% | 10,0% | 9,0% | 7,6% | 12,2% | 11,3% | 10,9% | 10,0% |
| X _q - quad. axis reactance | | 240% | 217% | 196% | 164% | 265% | 246% | 236% | 217% |
| T' _{do} - O.C. field time constant | | 1830ms | | | | | | | |
| T' _d - Transient time constant | | 112ms | | | | | | | |
| T'' _d - Sub-transient time constant | | 16ms | | | | | | | |

MECHANICAL DATA

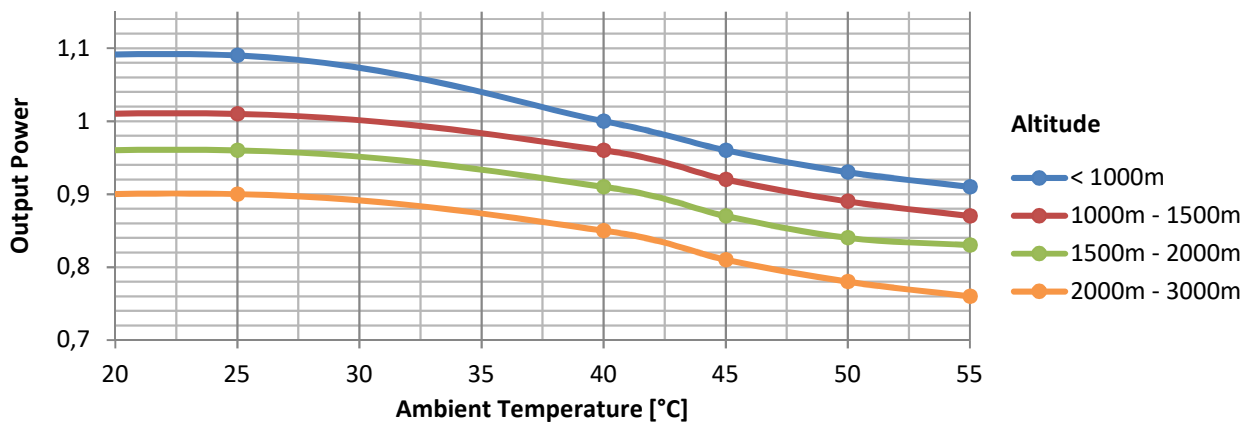
| | | | |
|---------------------------------|-----------|----|-------------|
| Bearing non drive end | | | 6314-2RS-C3 |
| Bearing drive end (B3/B14 form) | | | 6316-2RS-C3 |
| Weight of generator | in B2 | kg | 564 |
| | in B3/B14 | kg | 575 |
| | in B3/B9 | kg | \ |

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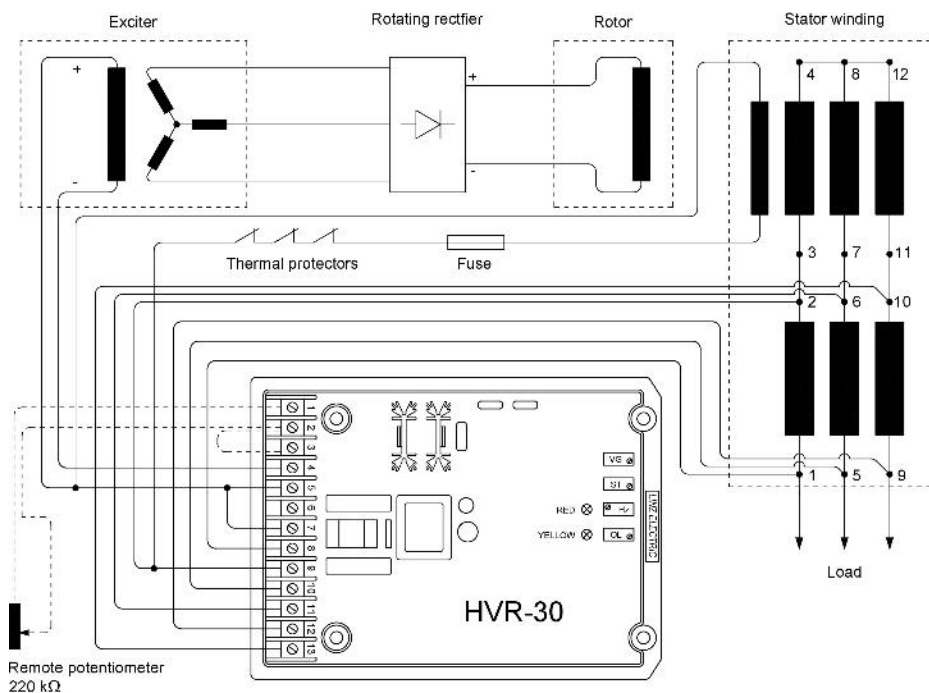
MOMENT OF INERZIA

| | | |
|---------|-------------------|-------|
| B3/B9 | kg·m ² | \ |
| SAE 7½ | kg·m ² | \ |
| SAE 8 | kg·m ² | \ |
| SAE 10 | kg·m ² | \ |
| SAE 11½ | kg·m ² | 2,302 |
| SAE 14 | kg·m ² | 2,417 |
| SAE 18 | kg·m ² | \ |
| B3/B14 | kg·m ² | 2,123 |

DERATING CURVES



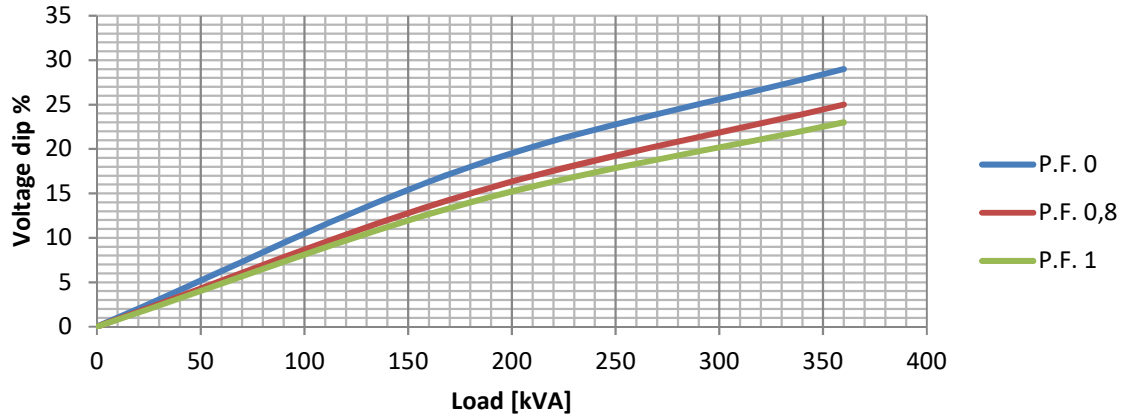
WIRING DIAGRAM



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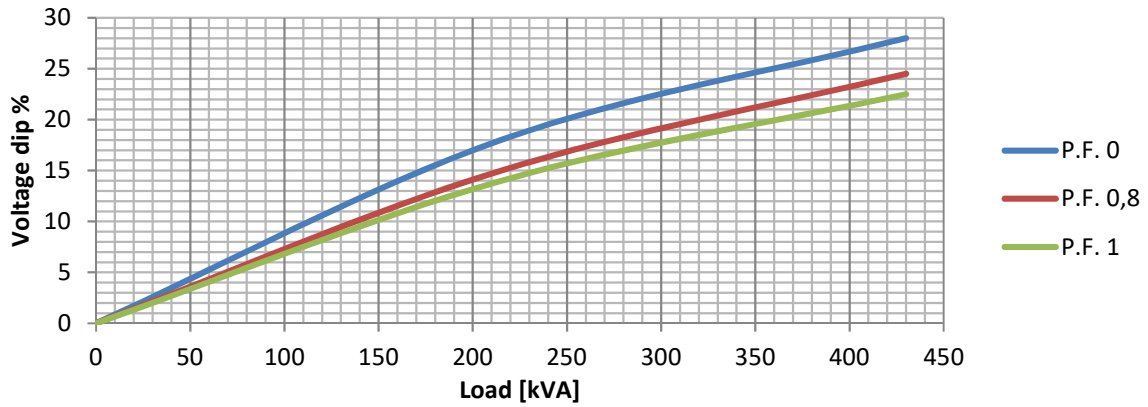
TRANSIENT VOLTAGE VARIATION 50Hz

Transient Voltage Variation @ 50Hz



TRANSIENT VOLTAGE VARIATION 60Hz

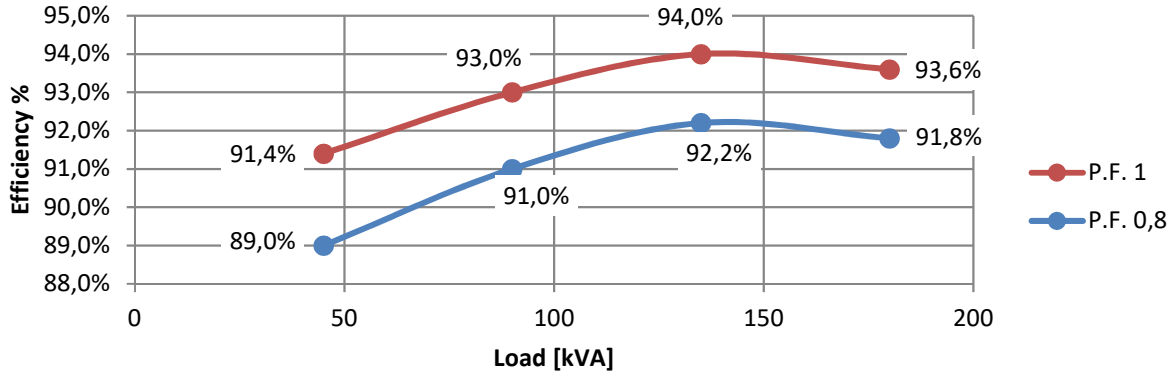
Transient Voltage Variation @ 60Hz



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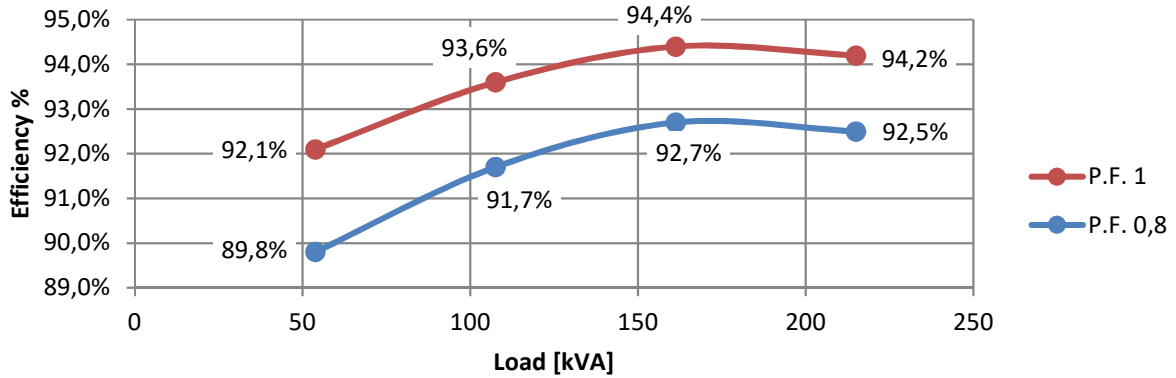
EFFICIENCY 50Hz

Efficiency Curves @ 50Hz



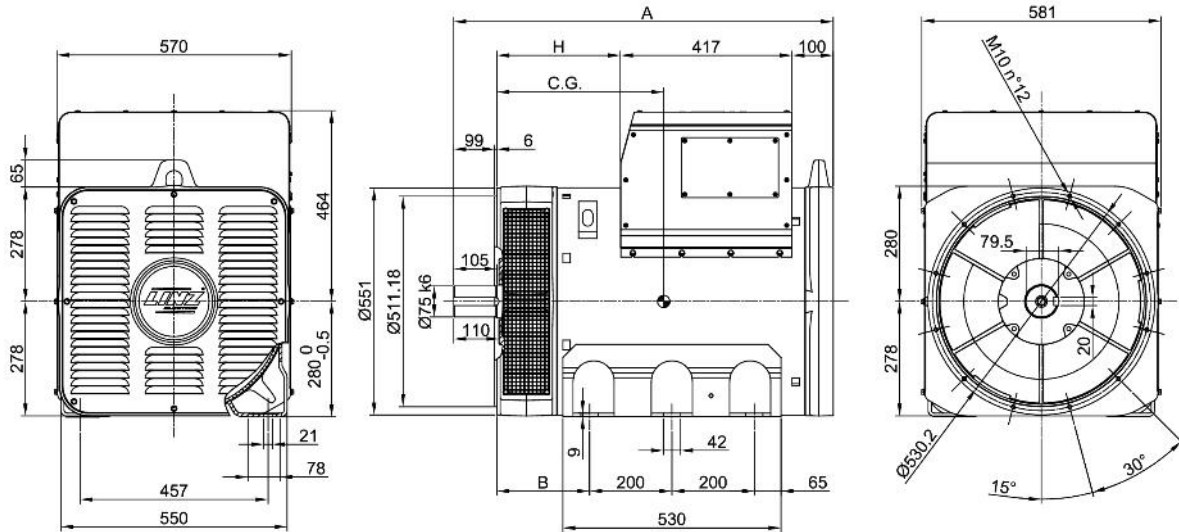
EFFICIENCY 60Hz

Efficiency Curves @ 60Hz

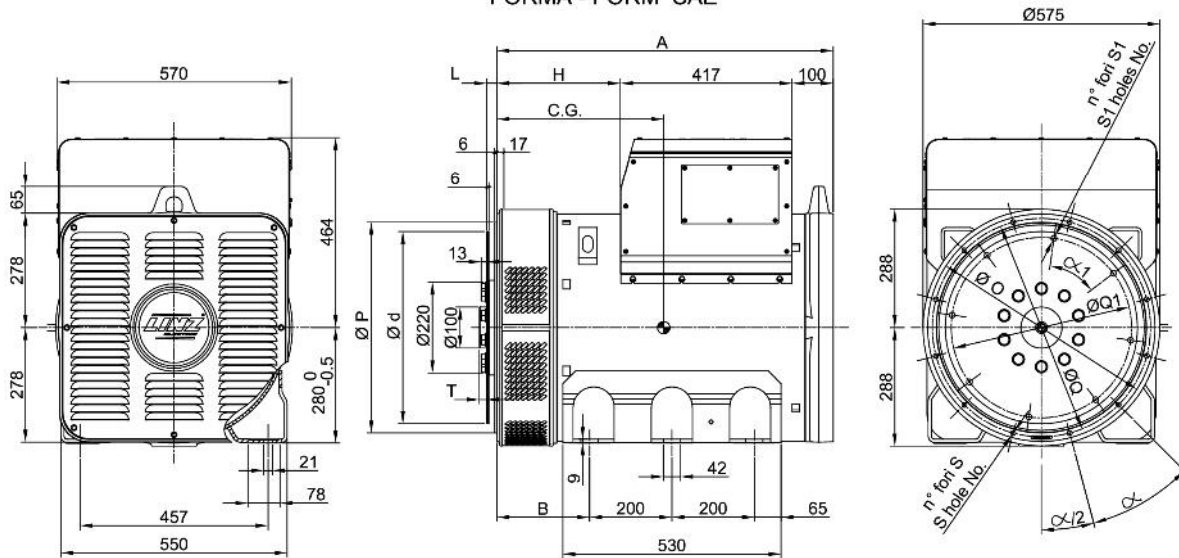


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FORMA - FORM B3/B14



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 |