

TECHNICAL DATA SHEET



**ALTERNATOR PRO18S A/4**

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

## PRO18S A/4

### COMMON DATA

|                      |                     |  |             |
|----------------------|---------------------|--|-------------|
| Rated Power at 50Hz  | kVA                 | 20   |             |
| Rated Power at 60Hz  | kVA                 | 24   |             |
| 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 | 5,5 at 50Hz  | 5,7 at 60Hz |
| R.F.I. Suppression   |                     | Standard EN55011                                       |             |

### REGULATION DATA

| AVR                     | HVR11                   | HVR30       |
|-------------------------|-------------------------|-------------|
| Sensing                 | single-phase            | three-phase |
| Voltage Regulation      | ±1%                     | ±1%         |
| Sustained Short Circuit | > 250% 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                                   | 0,224 at 20°C |  |
| Rotor Winding Resistance  | Ω                                   | 2,43 at 20°C  |  |
| Exciter Stator Resistance | Ω                                   | 15 at 20°C    |  |
| Exciter Rotor Resistance  | Ω                                   | 0,72 at 20°C  |  |
| THD at full load          | <3%                                 |               |  |
| THD at no load            | <3%                                 |               |  |
| Excitation at no load     | A <sub>dc</sub>                     | 0,92          |  |
| Excitation at full load   | A <sub>dc</sub>                     | 2,15          |  |

### 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

CAN/CSA - C22.2 No. 100-14 (R2009) Motors and Generators, UL1004-1 2nd ed. Rotating Electrical Machines - General Requirements, UL1004-4 2nd ed. Electric Generators

## PRO18S A/4

### ELECTRICAL DATA

| Frequency                              |     | 50Hz - 1500rpm |                |                |                | 60Hz - 1800rpm |                |                |                |
|--|-----|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| Voltage Series Star                    | V   | <b>380/220</b> | <b>400/230</b> | <b>415/240</b> | <b>440/254</b> | <b>415/240</b> | <b>440/254</b> | <b>460/266</b> | <b>480/277</b> |
| Rated Power in Class H<br>(125°C/40°C) | kVA | 20             | 20             | 20             | 18             | 21             | 23             | 24             | 24             |
|  | kW  | 16             | 16             | 16             | 14,4           | 16,8           | 18,4           | 19,2           | 19,2           |
| Rated Power in Class F<br>(105°C/40°C) | kVA | 18,5           | 18,5           | 18,5           | 17             | 20             | 21             | 22             | 22             |
|  | kW  | 14,8           | 14,8           | 14,8           | 13,6           | 16             | 16,8           | 17,6           | 17,6           |
| Rated Power Standby<br>(150°C/40°C)    | kVA | 22             | 22             | 21,5           | 20             | 24             | 25             | 26             | 26             |
|  | kW  | 17,6           | 17,6           | 17,2           | 16             | 19,2           | 20             | 20,8           | 20,8           |
| Rated Power Standby<br>(163°C/27°C)    | kVA | 23             | 23             | 22,5           | 21             | 25             | 26             | 27             | 27             |
|  | kW  | 18,4           | 18,4           | 18             | 16,8           | 20             | 20,8           | 21,6           | 21,6           |

### EFFICIENCY IN CL. H

|     |  |       |  |  |  |  |  |       |
|-----|--|-------|--|--|--|--|--|-------|
| 4/4 |  | 86,1% |  |  |  |  |  | 87,8% |
| 3/4 |  | 86,3% |  |  |  |  |  | 88,1% |
| 2/4 |  | 84,5% |  |  |  |  |  | 86,3% |
| 1/4 |  | 82,0% |  |  |  |  |  | 83,8% |

### REACTANCES AND TIME CONSTANTS

|  |  |       |       |       |       |       |       |       |       |
|--|--|-------|-------|-------|-------|-------|-------|-------|-------|
| pcc  |  | 0,57  |       |       |       |       |       |       |       |
| X <sub>d</sub> - dir. axis synchronous         |  | 268%  | 242%  | 225%  | 180%  | 283%  | 276%  | 264%  | 242%  |
| X' <sub>d</sub> - dir. axis transient          |  | 21,1% | 19,0% | 17,7% | 14,1% | 22,2% | 21,7% | 20,7% | 19,0% |
| X'' <sub>d</sub> - dir. axis subtransient      |  | 10,0% | 9,0%  | 8,4%  | 6,7%  | 10,5% | 10,3% | 9,8%  | 9,0%  |
| X <sub>q</sub> - quad. axis reactance          |  | 147%  | 133%  | 124%  | 99%   | 156%  | 152%  | 145%  | 133%  |
| T' <sub>do</sub> - O.C. field time constant    |  | 103ms |       |       |       |       |       |       |       |
| T' <sub>d</sub> - Transient time constant      |  | 7ms   |       |       |       |       |       |       |       |
| T'' <sub>d</sub> - Sub-transient time constant |  | 5ms   |       |       |       |       |       |       |       |

### MECHANICAL DATA

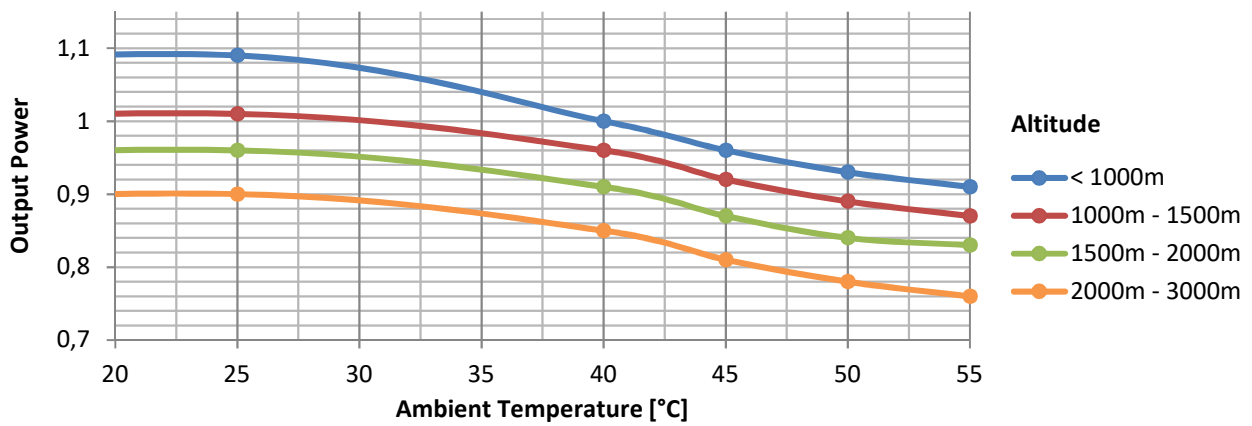
|                                 |           |             |     |
|---------------------------------|-----------|-------------|-----|
| Bearing non drive end           |           | 6307-2RS-C3 |     |
| Bearing drive end (B3/B14 form) |           | 6309-2RS-C3 |     |
| Weight of generator             | in B2     | kg          | 121 |
|                                 | in B3/B14 | kg          | 123 |
|                                 | in B3/B9  | kg          | \   |

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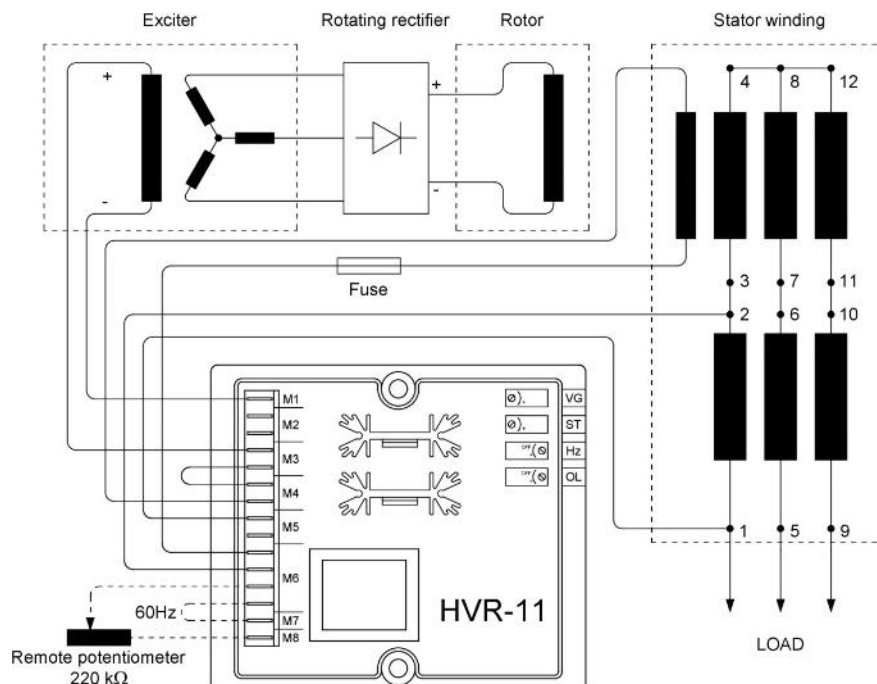
## MOMENT OF INERZIA

|         |                   |       |
|---------|-------------------|-------|
| B3/B9   | kg·m <sup>2</sup> | \     |
| SAE 7½  | kg·m <sup>2</sup> | 0,212 |
| SAE 8   | kg·m <sup>2</sup> | 0,221 |
| SAE 10  | kg·m <sup>2</sup> | 0,238 |
| SAE 11½ | kg·m <sup>2</sup> | 0,257 |
| SAE 14  | kg·m <sup>2</sup> | \     |
| SAE 18  | kg·m <sup>2</sup> | \     |
| B3/B14  | kg·m <sup>2</sup> | 0,197 |

## DERATING CURVES



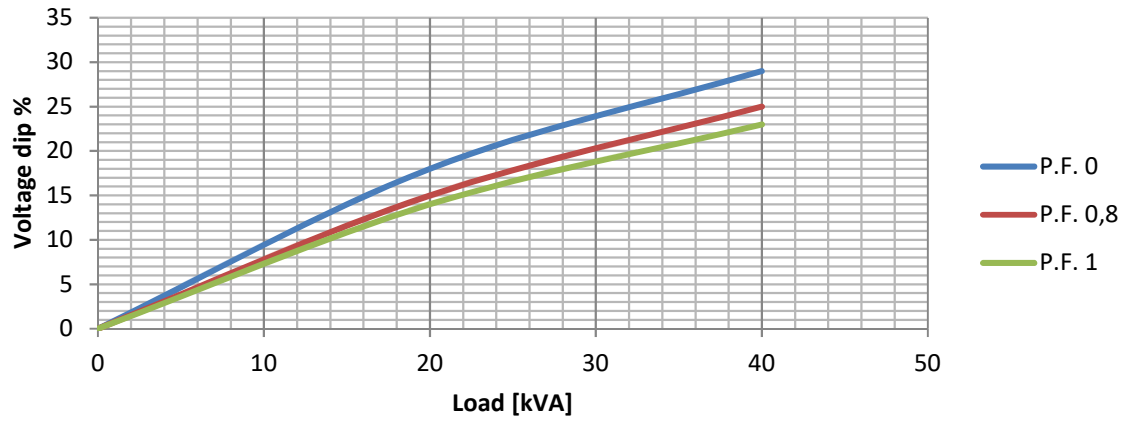
## WIRING DIAGRAM



# PRO18S A/4

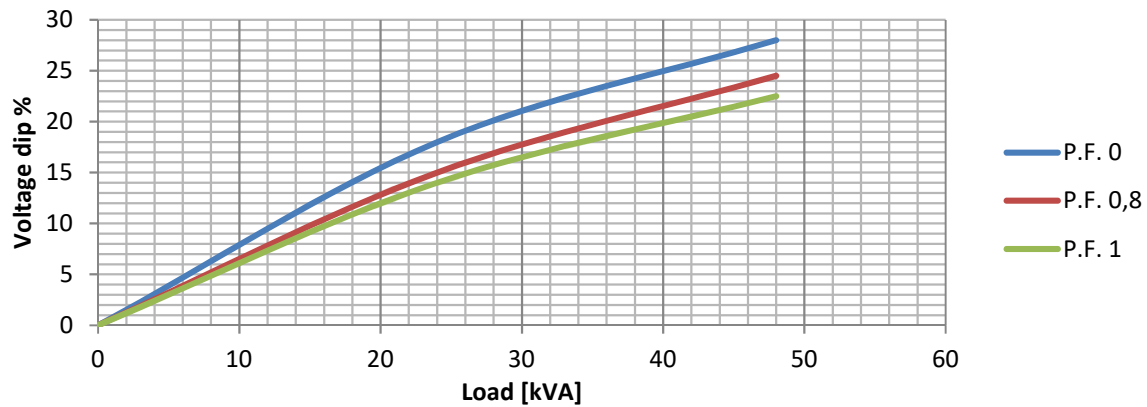
## TRANSIENT VOLTAGE VARIATION 50Hz

### Transient Voltage Variation @ 50Hz



## TRANSIENT VOLTAGE VARIATION 60Hz

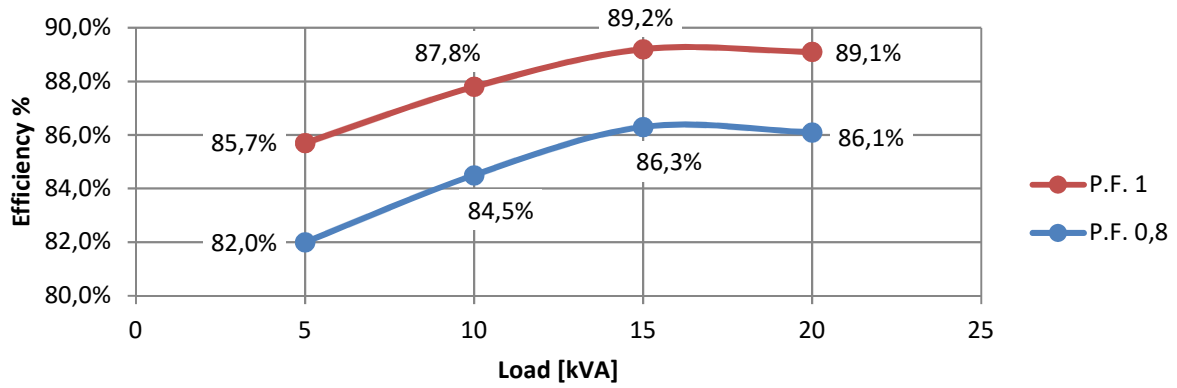
### Transient Voltage Variation @ 60Hz



# PRO18S A/4

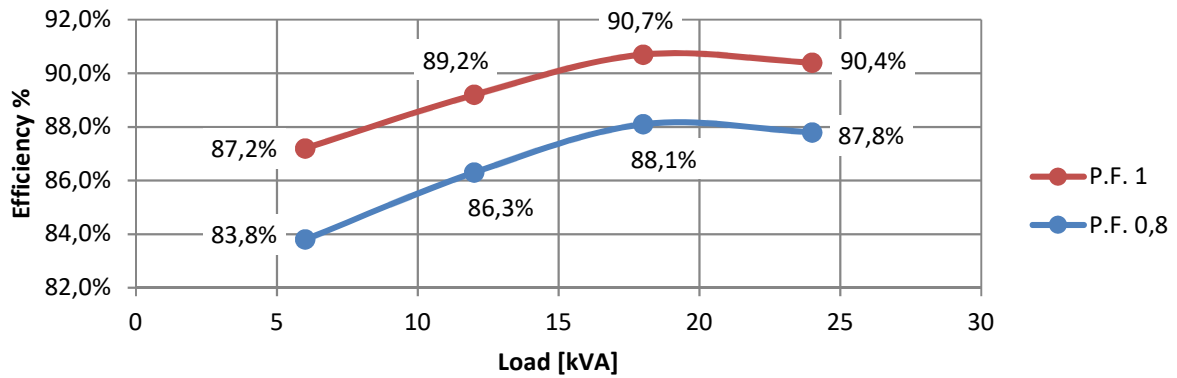
## EFFICIENCY 50Hz

### Efficiency Curves @ 50Hz



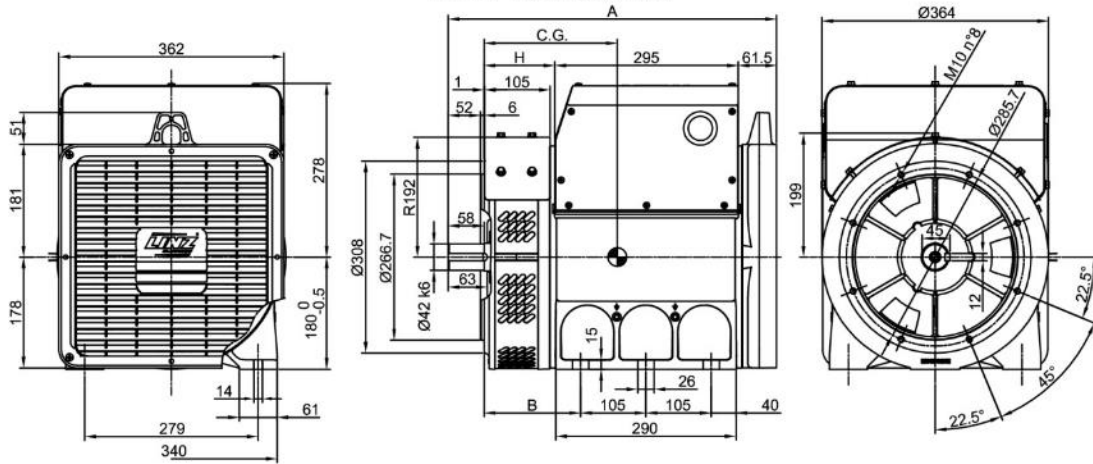
## EFFICIENCY 60Hz

### Efficiency Curves @ 60Hz

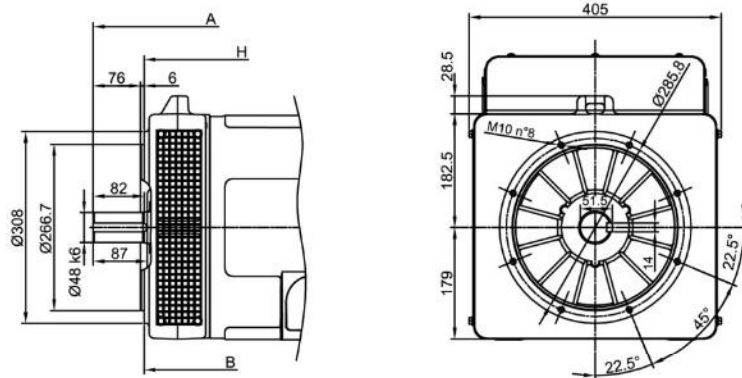


# PRO18S A/4

FORMA - FORM B3/B14 'S-M'



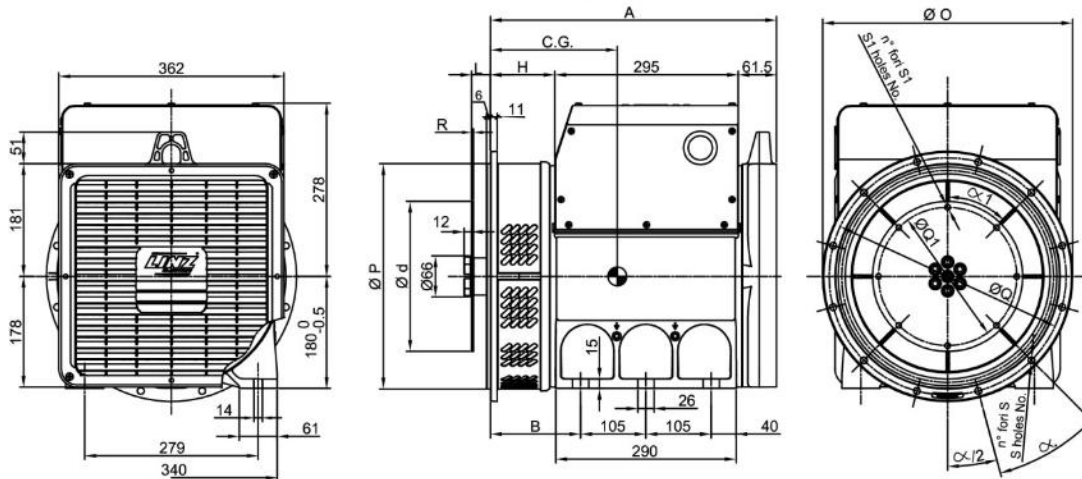
FORMA - FORM B3/B14 'L'



| TIPO - TYPE       | C.G. |
|-------------------|------|
| PRO18S A/4 B3/B14 | 217  |
| PRO18S B/4 B3/B14 | 221  |
| PRO18S C/4 B3/B14 | 228  |
| PRO18M D/4 B3/B14 | 251  |
| PRO18M E/4 B3/B14 | 262  |
| PRO18L F/4 B3/B14 | 301  |
| PRO18L G/4 B3/B14 | 318  |

| TIPO - TYPE    | C.G. |
|----------------|------|
| PRO18S A/4 SAE | 213  |
| PRO18S B/4 SAE | 217  |
| PRO18S C/4 SAE | 223  |
| PRO18M D/4 SAE | 246  |
| PRO18M E/4 SAE | 257  |
| PRO18L F/4 SAE | 296  |
| PRO18L G/4 SAE | 313  |

FORMA - FORM SAE



| FORMA - FORM | A       | B   | H     |
|--------------|---------|-----|-------|
| B3/B14       | PRO 18S | 528 | 113,5 |
|              | PRO 18M | 598 | 183,5 |
|              | PRO 18L | 734 | 295,5 |
|              | PRO 18S | 460 | 103,5 |
| SAE          | PRO 18M | 530 | 173,5 |
|              | PRO 18L | 642 | 285,5 |

| SAE N. | FLANGIE - FLANGES - BRIDAS |       |       |                   |    |     |
|--------|----------------------------|-------|-------|-------------------|----|-----|
|        | Ø O                        | Ø P   | Ø Q   | n. fori holes No. | S  | α   |
| 5      | 356                        | 314,3 | 333,4 | 8                 | 11 | 45° |
| 4      | 402                        | 362   | 381   | 12                |    | 30° |
| 3      | 451                        | 409,6 | 428,6 |                   |    |     |
| 2      | 490                        | 447,7 | 466,7 |                   |    |     |

| SAE N. | GIUNTI A DISCO - COUPLING DISCS - JUNTAS A DISCOS |        |        |                   |      |     |     |
|--------|---|--------|--------|-------------------|------|-----|-----|
|        | L   | Ø d    | Ø Q1   | n. fori holes No. | S1   | α 1 | R   |
| 6 1/2  | 30,2  | 215,9  | 200    | 6                 | 9    | 60° | 3   |
| 7 1/2  |   | 241,3  | 222,25 | 8                 |      | 45° |     |
| 8      | 62  | 263,52 | 244,47 | 6                 |      | 60° |     |
| 10     | 53,8  | 314,32 | 295,27 | 8                 | 10,5 | 45° | 4,5 |
| 11 1/2 | 39,6  | 352,42 | 333,37 |                   |      |     |     |