



**Tayseer Power Co.**

*Trade, Maintenance & Rental Of Elect. Generators*



# PERKINS GENERATOR

PRIME POWER

350 KVA (280 KW) (UK)



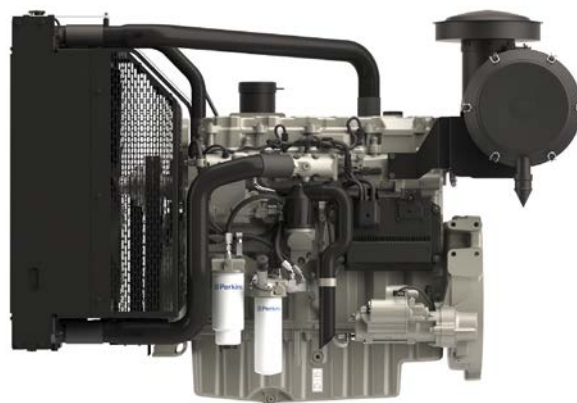
# 1500 Series 1506A-E88TAG5 Electropak

U.S. EPA Tier 3 Emergency Stationary Engines  
333 kWm standby net power @ 1800 rpm

Building upon Perkins proven reputation within the power generation industry the Perkins® 1500 Series Electropak engines now fit even closer to our customer's needs.

The 1506A-E88TAG5 Electropak is a 6 cylinder, fully electronic, turbocharged, air-to-air charge cooled diesel engine. It is economical, quiet and reliable and provides the high performance that is demanded by our customers for their power generation needs.

Focusing on the Perkins common platform theme, changes to engine envelope dimensions and connection points have been kept to a minimum, making for easy installation across the ratings.



| Specification              |                                    |              |
|----------------------------|------------------------------------|--------------|
| Number of cylinders        | 6 vertical in-line                 |              |
| Bore and stroke            | 112 x 149 mm                       | 4.5 x 5.8 in |
| Displacement               | 8.8 litres                         | 537 cubic in |
| Aspiration                 | Turbocharged aftercooled           |              |
| Cycle                      | 4 stroke                           |              |
| Combustion system          | Direct injection                   |              |
| Compression ratio          | 16.1:1                             |              |
| Rotation                   | Anti-clockwise, viewed on flywheel |              |
| Total lubricating capacity | 41 litres                          | 9.01 US gal  |
| Cooling system             | Liquid                             |              |

[www.perkins.com](http://www.perkins.com)

Photographs are for illustrative purposes only and may not reflect final specification.  
All information in this document is substantially correct at time of printing and may be altered subsequently.  
Final weight and dimensions will depend on completed specification.

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 **Perkins®**

THE HEART OF EVERY GREAT MACHINE

# 1500 Series 1506A-E88TAG5 ElectropaK

U.S. EPA Tier 3 Emergency Stationary Engines  
333 kWm standby net power @ 1800 rpm

## Features and benefits

### Dependable power

- The 1506A-E88TAG5 delivers greater productivity through an improved power to weight ratio
- The world-class power density has been achieved from an 8.8 litre turbocharged engine using a hydraulic actuated unit injection (HEUI) fuel system; making this engine robust for all markets due to its ability to cope with the variation of fuel quality around the world
- In its class, the 1506A-E88TAG5 has been designed to provide dependable power even in extreme ambient climates

### Low operating costs

- Oil change service intervals are set at 500 hours as standard
- Designed to provide low cost of ownership, simple maintenance and reduced downtime
- Perkins provides warranty coverage commencing on the date of delivery of new engines to the first user for 12 months, with 24 months on major core engine components. Consult Perkins Engines Company for detailed information

### Flexibility

- The 1506-E88TAG5 has been designed to hit the power node requirements of our customers
- Switchability functionality from 50 Hz/1500 rpm to 60 Hz/1800 rpm and vice versa is available to provide greater flexibility for frequency selection

### World class product support

- Perkins experienced global network of distributors and dealers, fully trained engine experts deliver total service support around the clock, 365 days a year. They have a comprehensive suite of web based tools at their disposal, covering technical information, parts identification and ordering systems, all dedicated to maximising the productivity of your engine
- Perkins actively pursues product support excellence by insisting our distribution network invest in their territory to provide customers with a consistent quality of support across the globe
- Throughout the entire life of a Perkins engine, we provide access to genuine OE specification parts giving 100% reassurance that you receive the very best in terms of quality for lowest possible cost, wherever your Perkins powered machine is operating in the world
- To find your local distributor: [www.perkins.com/distributor](http://www.perkins.com/distributor)

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# 1500 Series 1506A-E88TAG5 ElectropaK

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333 kWm standby net power @ 1800 rpm

## Technical information

### Air inlet system

- Mounted air filter and turbocharger

### Fuel system

- HEUI fuel system with full authority electronic control
- Electronic governing to ISO 8528-5 with stand-alone isochronous and load-sharing capabilities
- Fuel filter, fuel transfer pump, fuel priming pump
- Spin on primary, secondary and water filter separator

### Lubrication system

- Wet full aluminium sump with filler and dipstick
- Full-flow spin-on filters
- Oil pump, gear driven

### Cooling system

- Thermostatically controlled with belt driven, circulating pump and belt-drive fan
- Mounted belt driven pusher fan
- Radiator supplied loose with all guards and pipes
- Air-to-air charge cooler incorporated in radiator

### Electrical equipment

- 24V starter motor and 24V, 45 amp alternator with DC output
- Electronic Control Module (ECM) mounted on engine with wiring looms and sensors

### Flywheel and housing

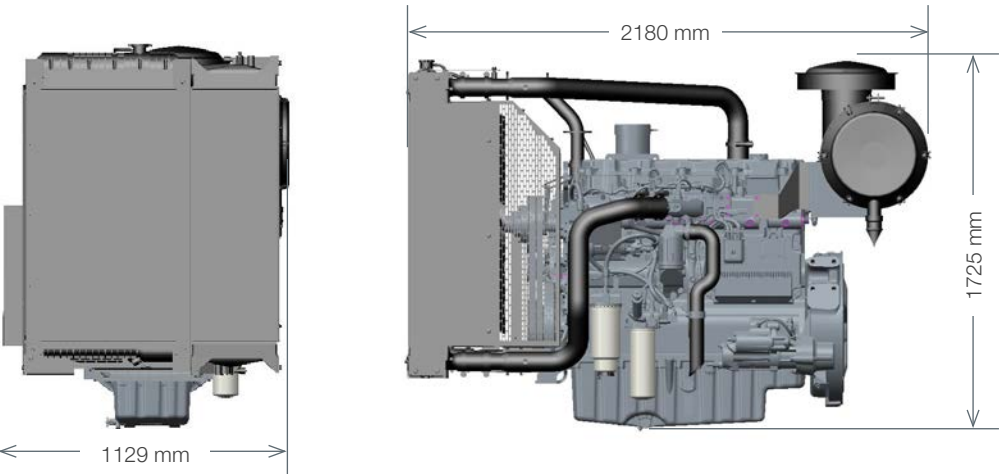
- High inertia flywheel to SAE 1 J620 Size 355.6 mm (14 in)
- Aluminium SAE 1 flywheel housing

### Mountings

- Front engine mounting bracket

# 1500 Series 1506A-E88TAG5 Electropak

U.S. EPA Tier 3 Emergency Stationary Engines  
333 kWm standby net power @ 1800 rpm



| Engine package weights and dimensions |         |         |
|---------------------------------------|---------|---------|
| Length (including air cleaner)        | 2180 mm | 86 in   |
| Width                                 | 1129 mm | 45 in   |
| Height                                | 1725 mm | 68 in   |
| Weight (dry)                          | 1175 kg | 2590 lb |

# 1500 Series 1506A-E88TAG5 ElectropaK

U.S. EPA Tier 3 Emergency Stationary Engines  
333 kWm standby net power @ 1800 rpm

| Speed<br>rpm | Type of<br>operation | Typical generator output |     | Engine power (Net) |     |
|--------------|----------------------|--------------------------|-----|--------------------|-----|
|              |                      | kVA                      | kWe | kWm                | hp  |
| 1800         | Prime power          | 352                      | 282 | 300                | 402 |
|              | Standby power        | 386                      | 309 | 333                | 446 |

| Percent of prime power | Fuel consumption at 1800 rpm<br>g/kWh | Fuel consumption at 1800 rpm<br>l/hr |
|------------------------|---------------------------------------|--------------------------------------|
| Standby power          | ?                                     | ?                                    |
| Prime power            | ?                                     | ?                                    |
| 75%                    | ?                                     | ?                                    |
| 50%                    | ?                                     | ?                                    |



**TAL 046**

## **Low Voltage Alternator - 4 pole**

180 to 365 kVA - 50 Hz / 225 to 438 kVA - 60 Hz  
Electrical and mechanical data

**LEROY-SOMER**™

**Nidec**  
All for dreams

## Adapted to needs

The TAL alternator range is designed to meet the needs of general applications such as prime power and stand-by.

## Compliant with international standards

The TAL range complies with international standards and regulations: IEC 60034 and derivative.

The range is designed, manufactured and marketed in an ISO 9001 and 14001 environment.

## Electrical design

- Class H insulation
- Shunt excitation
- Low voltage winding:
  - Three-phase 50 Hz: 380V - 400V - 415V - 440V / 220V - 230V - 240V
  - 60 Hz: 380V - 416V - 440V - 480V / 220V - 208V - 240V
- 6-terminal plates in 6-wire version or suitable for 12-wire option
- Optimized performance

## Robust design

- Compact and rugged assembly to withstand engine vibrations
- Steel frame
- Cast iron flanges and shields
- Single bearing design to be suitable with most diesel engines
- Sealed for life bearing
- Direction of rotation: clockwise and counterclockwise without derating

## Excitation and regulation system suited to the application

|                      | Excitation system |          |          |          | Regulation options  |                              |                      |
|----------------------|-------------------|----------|----------|----------|---------------------|------------------------------|----------------------|
|                      | AVR               | Shunt    | AREP     | PMG      | UL <sub>C</sub> /US | Remote voltage potentiometer | C.T. for paralleling |
| Three-phase 6-wire   | R150              | Standard |          |          |                     | √                            |                      |
|                      | R180              |          | Standard | Standard |                     | √                            | √                    |
|                      | R450              |          | Option   | Option   | √                   | √                            | √                    |
| Three-phase 12-wire* | R250              | Standard |          |          | √                   | √                            |                      |
|                      | R180              |          | Standard | Standard |                     | √                            | √                    |
|                      | R450              |          | Option   | Option   | √                   | √                            | √                    |

√ : Possible option      \*with larger terminal box

## Compact terminal box

- Easy access to AVR and terminals
- Standard terminal box with possibility of mounting measurement CTs
- Possibility of current transformer for parallel operation

## Environment and protection

- IP Code IP 23
- Standard winding protection for non-harsh environments with relative humidity ≤ 95%

## Available options

- Three-phase 12-wire with 9-terminal plates
- AREP or PMG excitation
- UL<sub>C</sub>/US
- Customized painting
- Space heaters
- Droop kit for alternator paralleling
- Stator sensors
- Winding 8 optimized for three-phase 380V - 416 V / 60 Hz
- Winding protection for harsh environments and relative humidity greater than 95% (system 2 - 4): for TAL 046 H apply a derating coefficient of 0.97



## General characteristics

|                                               |                                           |                                                   |         |            |
|-----------------------------------------------|-------------------------------------------|---------------------------------------------------|---------|------------|
| Insulation class                              | H                                         | Excitation system 6-wire                          | SHUNT   | AREP / PMG |
| Winding pitch                                 | 2/3 (wind.6S - 6-wire / wind.6 - 12-wire) | AVR type                                          | R150    | R180       |
| Number of wires                               | 6-wire (12-wire option)                   | Excitation system 12-wire (option)                | SHUNT   | AREP / PMG |
| Protection                                    | IP 23                                     | AVR type                                          | R250    | R180       |
| Altitude                                      | ≤ 1000 m                                  | Voltage regulation (*)                            | ± 1 %   |            |
| Overspeed                                     | 2250 R.P.M.                               | Total Harmonic Distortion THD (**) in no-load     | < 2.5 % |            |
| Air flow (m³/s)                               | 0.48                                      | Total Harmonic Distortion THD (**) in linear load | < 5 %   |            |
| Air flow (m³/s)                               | 0.58                                      | Waveform: NEMA = TIF (**)                         | < 50    |            |
| AREP Short-circuit current = 2.7 In: 5 second |                                           | Waveform: I.E.C. = THF (**)                       | < 2%    |            |

(\*) Steady state (\*\*) Total harmonic distortion between phases, no-load or on-load (non-distorting)

## Ratings 50 Hz - 1500 R.P.M.

**kVA / kW - P.F. = 0.8**

| Duty / T° C  | Continuous / 40 °C |      |      |       |      | Continuous / 40 °C |      |      |       |      | Stand-by / 40 °C |      |      |       |      | Stand-by / 27 °C |      |      |       |      |     |  |  |  |
|--------------|--------------------|------|------|-------|------|--------------------|------|------|-------|------|------------------|------|------|-------|------|------------------|------|------|-------|------|-----|--|--|--|
| Class / T° K | H / 125° K         |      |      |       |      | F / 105° K         |      |      |       |      | H / 150° K       |      |      |       |      | H / 163° K       |      |      |       |      |     |  |  |  |
| Phase        | 3 ph.              |      |      | 1 ph. |      | 3 ph.              |      |      | 1 ph. |      | 3 ph.            |      |      | 1 ph. |      | 3 ph.            |      |      | 1 ph. |      |     |  |  |  |
| Y            | 380V               | 400V | 415V | 440V  |      | 380V               | 400V | 415V | 440V  |      | 380V             | 400V | 415V | 440V  |      | 380V             | 400V | 415V | 440V  |      |     |  |  |  |
| Δ            | 220V               | 230V | 240V |       | 230V | 220V               | 230V | 240V |       | 230V | 220V             | 230V | 240V |       | 230V | 220V             | 230V | 240V |       | 230V |     |  |  |  |
| YY (*)       | 200V               |      | 220V |       |      | 200V               |      | 220V |       |      | 200V             |      | 220V |       |      | 200V             |      | 220V |       |      |     |  |  |  |
| ΔΔ (*)       |                    |      |      |       | 230V |                    |      |      |       | 230V |                  |      |      |       | 230V |                  |      |      |       | 230V |     |  |  |  |
| TAL 046 A    | kVA                | 180  | 180  | 180   | 171  | 108                | 164  | 164  | 164   | 156  | 98               | 191  | 191  | 191   | 181  | 114              | 200  | 200  | 200   | 188  | 119 |  |  |  |
|              | kW                 | 144  | 144  | 144   | 137  | 86                 | 131  | 131  | 131   | 125  | 78               | 153  | 153  | 153   | 145  | 91               | 160  | 160  | 160   | 150  | 95  |  |  |  |
| TAL 046 B    | kVA                | 200  | 200  | 200   | 190  | 120                | 182  | 182  | 182   | 173  | 109              | 212  | 212  | 212   | 201  | 127              | 220  | 220  | 220   | 209  | 132 |  |  |  |
|              | kW                 | 160  | 160  | 160   | 152  | 96                 | 146  | 146  | 146   | 138  | 87               | 170  | 170  | 170   | 161  | 102              | 176  | 176  | 176   | 167  | 106 |  |  |  |
| TAL 046 C    | kVA                | 230  | 230  | 230   | 219  | 138                | 209  | 209  | 209   | 199  | 126              | 244  | 244  | 244   | 232  | 146              | 253  | 253  | 253   | 241  | 152 |  |  |  |
|              | kW                 | 184  | 184  | 184   | 175  | 110                | 167  | 167  | 167   | 159  | 101              | 195  | 195  | 195   | 186  | 117              | 202  | 202  | 202   | 193  | 122 |  |  |  |
| TAL 046 D    | kVA                | 240  | 250  | 250   | 238  | 150                | 218  | 228  | 228   | 217  | 137              | 254  | 265  | 265   | 252  | 159              | 264  | 275  | 275   | 262  | 165 |  |  |  |
|              | kW                 | 192  | 200  | 200   | 190  | 120                | 175  | 182  | 182   | 174  | 110              | 204  | 212  | 212   | 202  | 127              | 211  | 220  | 220   | 210  | 132 |  |  |  |
| TAL 046 E    | kVA                | 275  | 275  | 275   | 261  | 165                | 250  | 250  | 250   | 238  | 150              | 292  | 292  | 292   | 277  | 175              | 303  | 303  | 303   | 287  | 182 |  |  |  |
|              | kW                 | 220  | 220  | 220   | 209  | 132                | 200  | 200  | 200   | 190  | 120              | 234  | 234  | 234   | 222  | 140              | 242  | 242  | 242   | 230  | 146 |  |  |  |
| TAL 046 F    | kVA                | 290  | 300  | 300   | 285  | 180                | 264  | 273  | 273   | 259  | 164              | 307  | 318  | 318   | 302  | 191              | 319  | 330  | 330   | 314  | 198 |  |  |  |
|              | kW                 | 232  | 240  | 240   | 228  | 144                | 211  | 218  | 218   | 207  | 131              | 246  | 254  | 254   | 242  | 153              | 255  | 264  | 264   | 251  | 158 |  |  |  |
| TAL 046 G    | kVA                | 325  | 325  | 325   | 309  | 195                | 296  | 296  | 296   | 281  | 177              | 345  | 345  | 345   | 328  | 207              | 360  | 360  | 360   | 340  | 215 |  |  |  |
|              | kW                 | 260  | 260  | 260   | 247  | 156                | 237  | 237  | 237   | 225  | 142              | 276  | 276  | 276   | 262  | 166              | 288  | 288  | 288   | 272  | 172 |  |  |  |
| TAL 046 H    | kVA                | 350  | 365  | 365   | 347  | 210                | 318  | 332  | 332   | 316  | 191              | 371  | 387  | 387   | 368  | 223              | 385  | 400  | 400   | 382  | 231 |  |  |  |
|              | kW                 | 280  | 292  | 292   | 278  | 168                | 255  | 266  | 266   | 253  | 153              | 297  | 310  | 310   | 294  | 178              | 308  | 320  | 320   | 306  | 185 |  |  |  |

(\*) 12-wire option

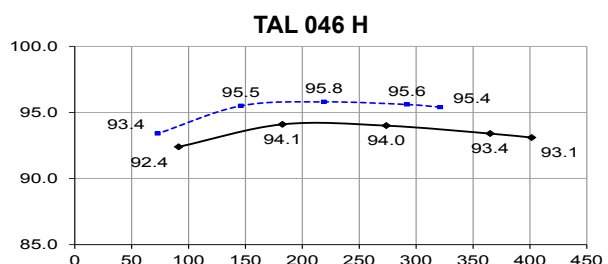
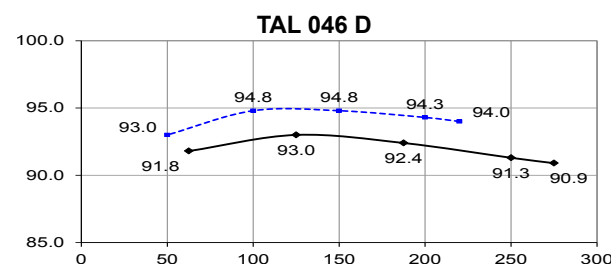
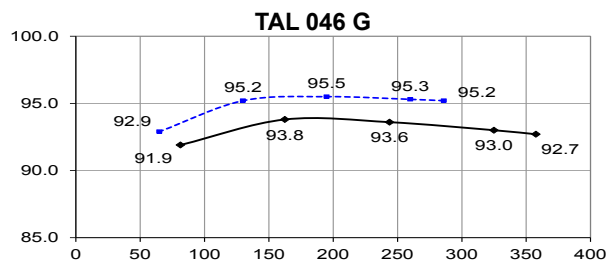
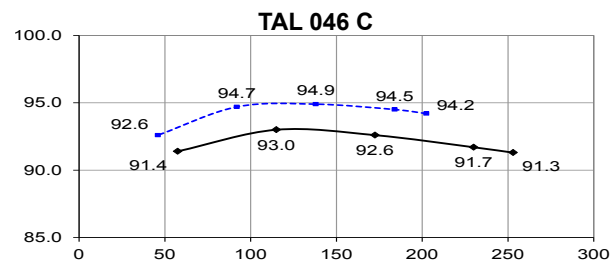
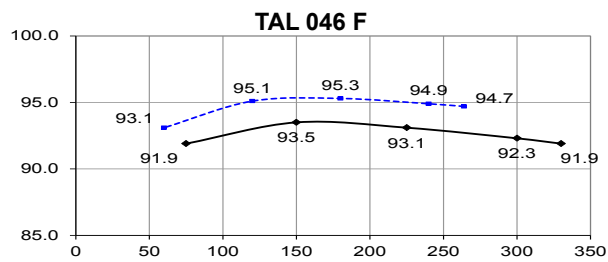
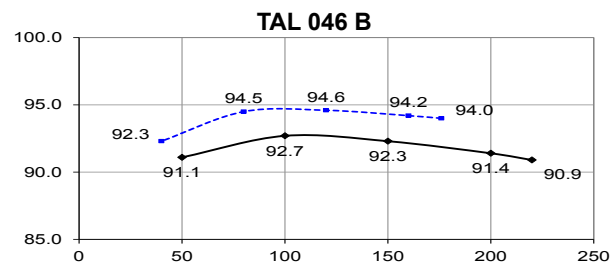
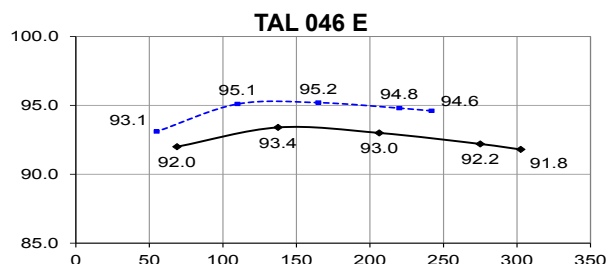
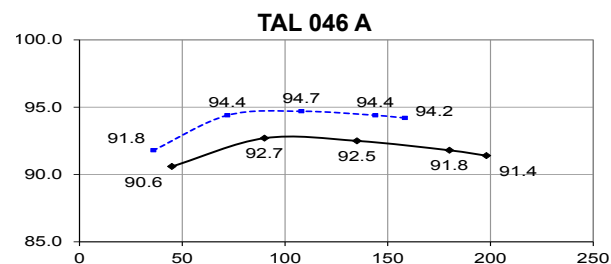
## Ratings 60 Hz - 1800 R.P.M.

**kVA / kW - P.F. = 0.8**

| Duty / T° C  | Continuous / 40 °C |      |      |       |      | Continuous / 40 °C |      |      |       |      | Stand-by / 40 °C |      |      |       |      | Stand-by / 27 °C |      |      |       |      |     |
|--------------|--------------------|------|------|-------|------|--------------------|------|------|-------|------|------------------|------|------|-------|------|------------------|------|------|-------|------|-----|
| Class / T° K | H / 125° K         |      |      |       |      | F / 105° K         |      |      |       |      | H / 150° K       |      |      |       |      | H / 163° K       |      |      |       |      |     |
| Phase        | 3 ph.              |      |      | 1 ph. |      | 3 ph.              |      |      | 1 ph. |      | 3 ph.            |      |      | 1 ph. |      | 3 ph.            |      |      | 1 ph. |      |     |
| Y            | 380V               | 416V | 440V | 480V  |      | 380V               | 416V | 440V | 480V  |      | 380V             | 416V | 440V | 480V  |      | 380V             | 416V | 440V | 480V  |      |     |
| Δ            | 220V               | 240V |      |       | 240V | 220V               | 240V |      |       | 240V | 220V             | 240V |      |       | 240V | 220V             | 240V |      |       | 240V |     |
| YY (*)       | 208V               |      | 220V | 240V  |      | 208V               |      | 220V | 240V  |      | 208V             |      | 220V | 240V  |      | 208V             |      | 220V | 240V  |      |     |
| ΔΔ (*)       |                    |      |      |       | 240V |                    |      |      |       | 240V |                  |      |      |       | 240V |                  |      |      |       | 240V |     |
| TAL 046 A    | kVA                | 180  | 195  | 210   | 225  | 120                | 164  | 177  | 191   | 205  | 109              | 191  | 207  | 223   | 239  | 127              | 200  | 215  | 230   | 250  | 132 |
|              | kW                 | 144  | 156  | 168   | 180  | 96                 | 131  | 142  | 153   | 164  | 87               | 153  | 166  | 178   | 191  | 102              | 160  | 172  | 184   | 200  | 106 |
| TAL 046 B    | kVA                | 200  | 215  | 230   | 250  | 132                | 182  | 196  | 209   | 228  | 120              | 212  | 228  | 244   | 265  | 140              | 220  | 237  | 253   | 275  | 145 |
|              | kW                 | 160  | 172  | 184   | 200  | 106                | 146  | 157  | 167   | 182  | 96               | 170  | 182  | 195   | 212  | 112              | 176  | 190  | 202   | 220  | 116 |
| TAL 046 C    | kVA                | 226  | 250  | 262   | 288  | 152                | 206  | 228  | 238   | 262  | 138              | 240  | 265  | 278   | 305  | 161              | 250  | 275  | 288   | 316  | 167 |
|              | kW                 | 181  | 200  | 210   | 230  | 122                | 165  | 182  | 190   | 210  | 110              | 192  | 212  | 222   | 244  | 129              | 200  | 220  | 230   | 253  | 134 |
| TAL 046 D    | kVA                | 245  | 265  | 280   | 313  | 165                | 223  | 241  | 255   | 285  | 150              | 260  | 281  | 297   | 332  | 175              | 270  | 292  | 308   | 344  | 182 |
|              | kW                 | 196  | 212  | 224   | 250  | 132                | 178  | 193  | 204   | 228  | 120              | 208  | 225  | 238   | 266  | 140              | 216  | 234  | 246   | 275  | 146 |
| TAL 046 E    | kVA                | 275  | 300  | 315   | 344  | 182                | 250  | 273  | 287   | 313  | 166              | 292  | 318  | 334   | 365  | 193              | 303  | 330  | 347   | 378  | 200 |
|              | kW                 | 220  | 240  | 252   | 275  | 146                | 200  | 218  | 230   | 250  | 133              | 234  | 254  | 267   | 292  | 154              | 242  | 264  | 278   | 302  | 160 |
| TAL 046 F    | kVA                | 290  | 315  | 340   | 360  | 200                | 264  | 287  | 309   | 328  | 182              | 307  | 334  | 360   | 382  | 212              | 320  | 347  | 374   | 400  | 220 |
|              | kW                 | 232  | 252  | 272   | 288  | 160                | 211  | 230  | 247   | 262  | 146              | 246  | 267  | 288   | 306  | 170              | 256  | 278  | 299   | 320  | 176 |
| TAL 046 G    | kVA                | 315  | 345  | 365   | 406  | 215                | 287  | 314  | 332   | 369  | 196              | 334  | 366  | 387   | 430  | 228              | 347  | 380  | 402   | 447  | 237 |
|              | kW                 | 252  | 276  | 292   | 325  | 172                | 230  | 251  | 266   | 295  | 157              | 267  | 293  | 310   | 344  | 182              | 278  | 304  | 322   | 358  | 190 |
| TAL 046 H    | kVA                | 345  | 375  | 400   | 438  | 231                | 314  | 341  | 364   | 399  | 210              | 366  | 398  | 424   | 464  | 245              | 380  | 413  | 440   | 480  | 254 |
|              | kW                 | 276  | 300  | 320   | 350  | 185                | 251  | 273  | 291   | 319  | 168              | 293  | 318  | 339   | 371  | 196              | 304  | 330  | 352   | 384  | 203 |

(\*) 12-wire option

## Efficiencies 400 V - 50 Hz (— P.F.: 0.8) (..... P.F.: 1)



## Reactances (%). Time constants (ms) - Class H / 400 V

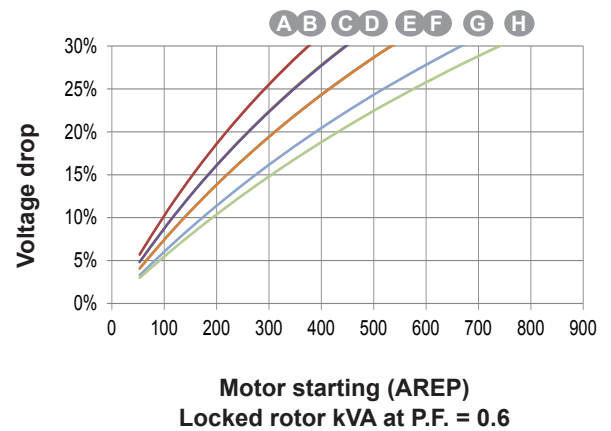
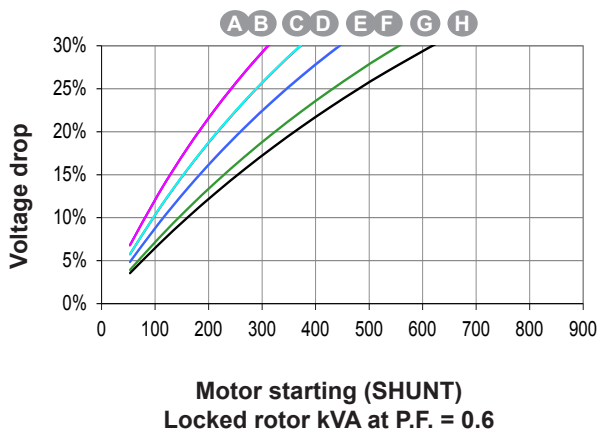
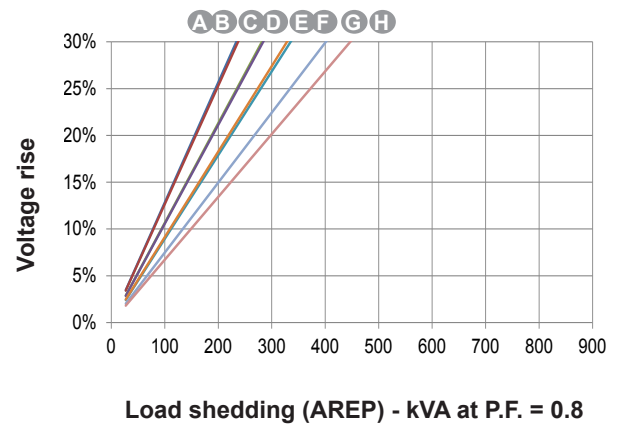
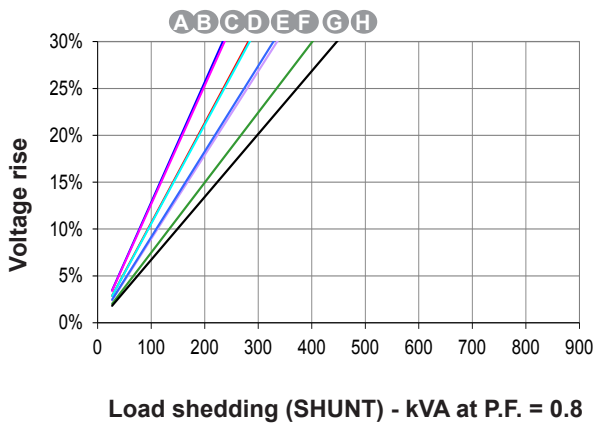
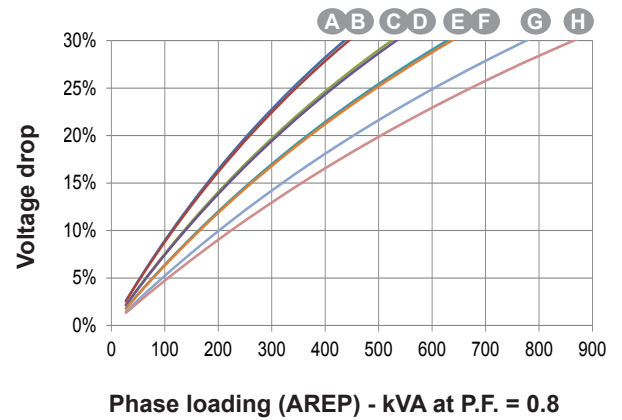
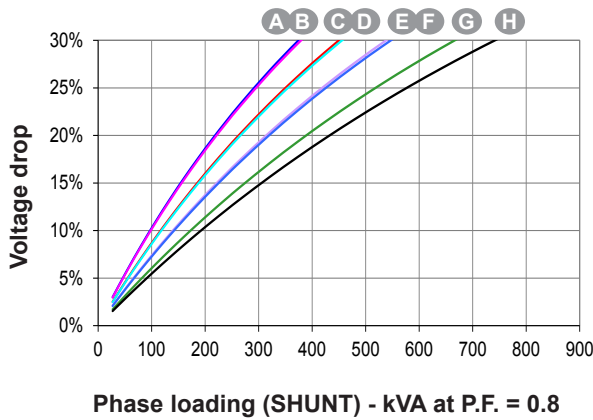
|                                                              | A    | B    | C    | D    | E    | F    | G    | H    |
|--------------------------------------------------------------|------|------|------|------|------|------|------|------|
| <b>Kcc</b> Short-circuit ratio                               | 0.39 | 0.35 | 0.37 | 0.34 | 0.37 | 0.4  | 0.45 | 0.43 |
| <b>Xd</b> Direct-axis synchro. reactance unsaturated         | 313  | 348  | 340  | 370  | 347  | 335  | 297  | 303  |
| <b>Xq</b> Quadrature-axis synchro. reactance unsaturated     | 159  | 177  | 173  | 188  | 177  | 171  | 151  | 154  |
| <b>T'do</b> No-load transient time constant                  | 1956 | 1956 | 1983 | 1983 | 2018 | 2033 | 2072 | 2093 |
| <b>X'd</b> Direct-axis transient reactance saturated         | 16   | 17.7 | 17.1 | 18.6 | 17.1 | 16.5 | 14.3 | 14.5 |
| <b>T'd</b> Short-circuit transient time constant             | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  |
| <b>X''d</b> Direct-axis subtransient reactance saturated     | 12.8 | 14.2 | 13.7 | 14.9 | 13.7 | 13.2 | 11.4 | 11.6 |
| <b>T''d</b> Subtransient time constant                       | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   |
| <b>X''q</b> Quadrature-axis subtransient reactance saturated | 16.4 | 18.2 | 17.4 | 18.9 | 17.2 | 16.4 | 14.1 | 14.2 |
| <b>Xo</b> Zero sequence reactance                            | 0.66 | 0.74 | 0.71 | 0.77 | 0.71 | 0.68 | 0.59 | 0.6  |
| <b>X2</b> Negative sequence reactance saturated              | 14.6 | 16.2 | 15.6 | 16.9 | 15.5 | 14.8 | 12.8 | 12.9 |
| <b>Ta</b> Armature time constant                             | 15   | 15   | 15   | 15   | 15   | 15   | 15   | 15   |

## Other class H / 400 V data

|                                                                                |       |       |       |       |       |       |       |       |
|--------------------------------------------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| <b>io (A)</b> No-load excitation current SHUNT/AREP                            | 0.95  | 0.95  | 1.01  | 1.01  | 1.1   | 1.1   | 1.06  | 1.06  |
| <b>ic (A)</b> On-load excitation current SHUNT/AREP                            | 3.4   | 3.72  | 3.84  | 4.14  | 3.99  | 3.64  | 3.63  | 3.63  |
| <b>uc (V)</b> On-load excitation voltage SHUNT/AREP                            | 48    | 52.4  | 37.4  | 40.2  | 55.6  | 46.2  | 42.1  | 41.9  |
| <b>ms</b> Response time ( $\Delta U = 20\%$ transient)                         | 500   | 500   | 500   | 500   | 500   | 500   | 500   | 500   |
| <b>kVA</b> Start ( $\Delta U = 20\%$ cont. or $\Delta U = 30\%$ trans.) SHUNT* | 311   | 311   | 372   | 371   | 444   | 445   | 556   | 618   |
| <b>kVA</b> Start ( $\Delta U = 20\%$ cont. or $\Delta U = 30\%$ trans.) AREP*  | 374   | 376   | 446   | 447   | 533   | 534   | 667   | 741   |
| <b>%</b> Transient $\Delta U$ (on-load 4/4) SHUNT - P.F.: 0.8 <sub>LAG</sub>   | 17.1  | 18.4  | 18    | 19.1  | 18    | 19.1  | 17.4  | 17.4  |
| <b>%</b> Transient $\Delta U$ (on-load 4/4) AREP - P.F.: 0.8 <sub>LAG</sub>    | 15.1  | 16.2  | 15.8  | 16.8  | 16.2  | 17.2  | 17.3  | 15.4  |
| <b>W</b> No-load losses                                                        | 2977  | 2977  | 3297  | 3297  | 3625  | 4013  | 4541  | 4750  |
| <b>W</b> Heat dissipation                                                      | 12841 | 15040 | 16562 | 18869 | 18504 | 19800 | 19303 | 20484 |

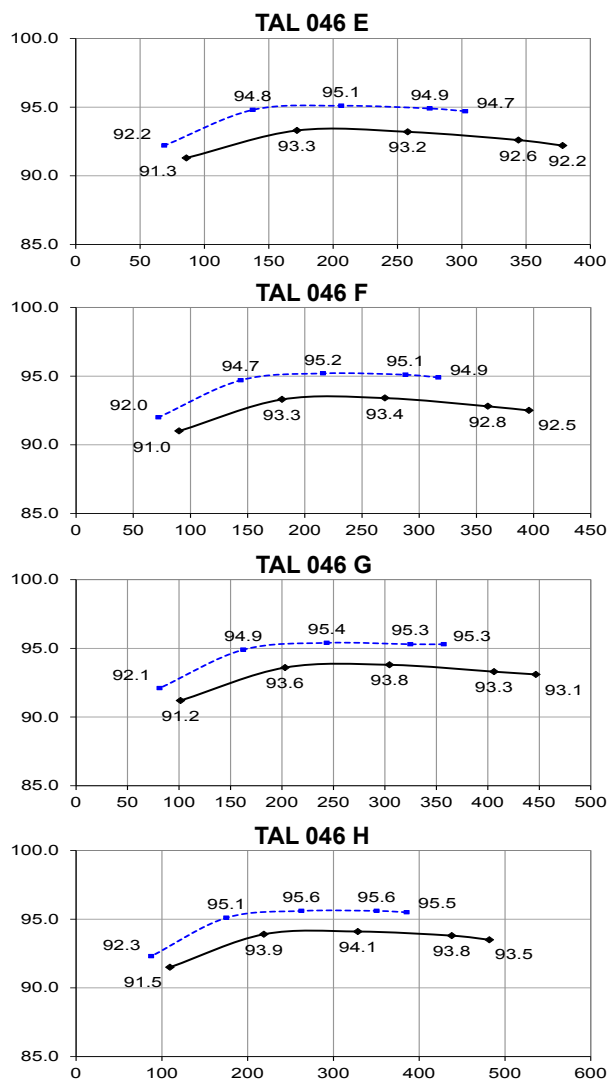
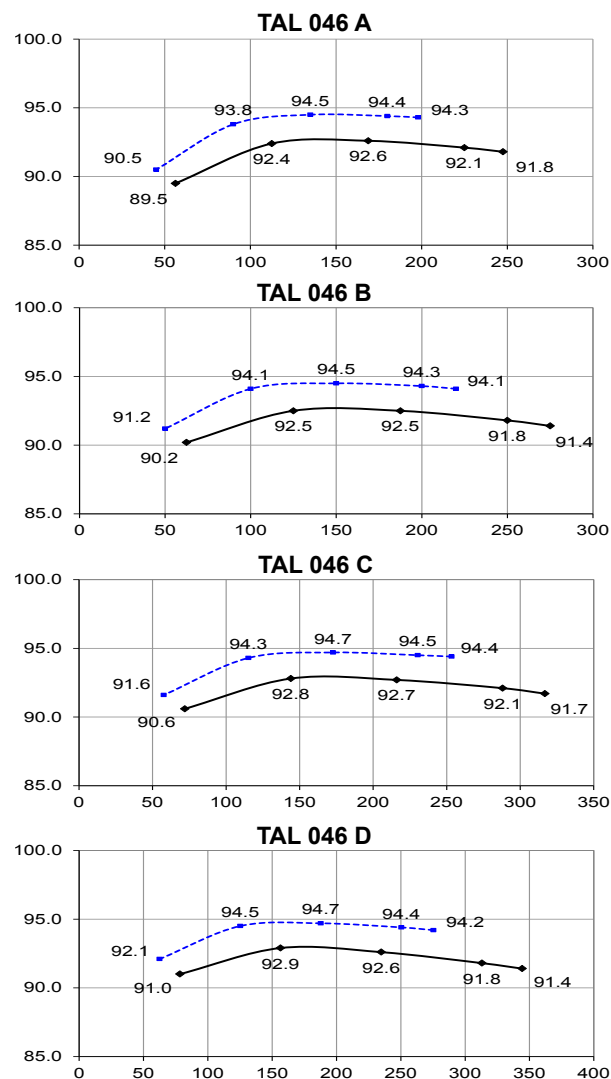
\* P.F. = 0.6

**Transient voltage variation 400 V - 50 Hz**



- 1) For a starting P.F. other than 0.6, the starting kVA must be multiplied by  $K = \text{Sine P.F.} / 0.6$
- 2) For voltages other than 400V (Y), 230V ( $\Delta$ ) at 50 Hz, then kVA must be multiplied by  $(400/U)^2$  or  $(230/U)^2$ .

**Efficiencies 480 V - 60 Hz (— P.F.: 0.8) (..... P.F.: 1)**



**Reactances (%). Time constants (ms) - Class H / 480 V**

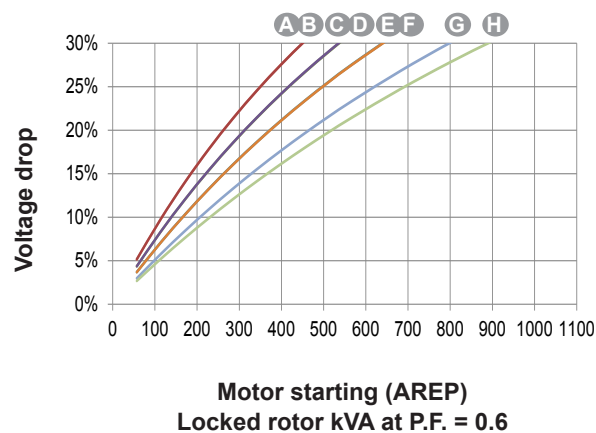
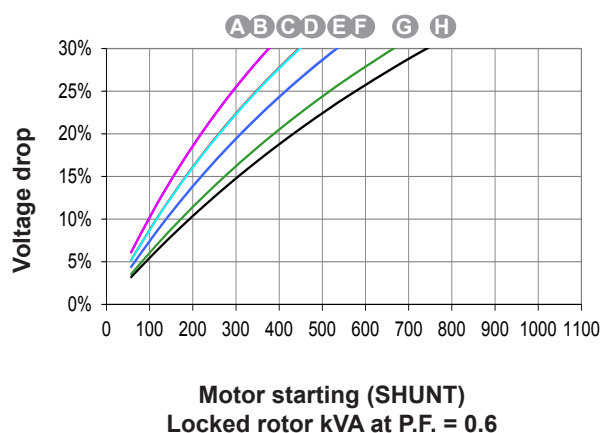
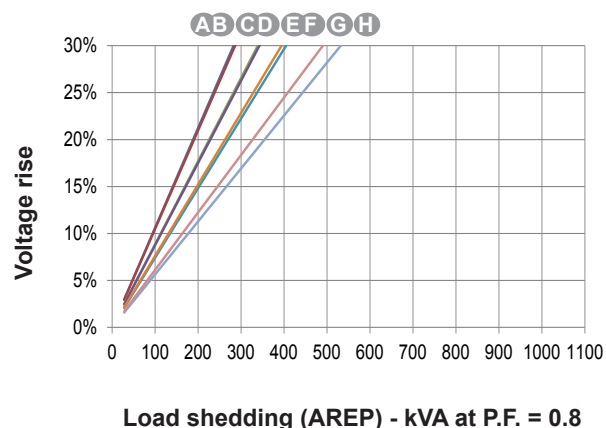
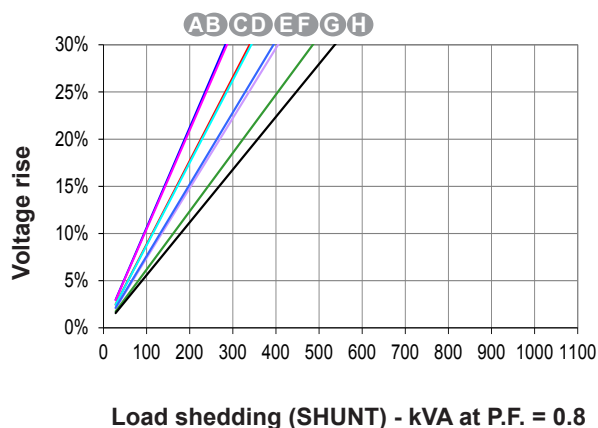
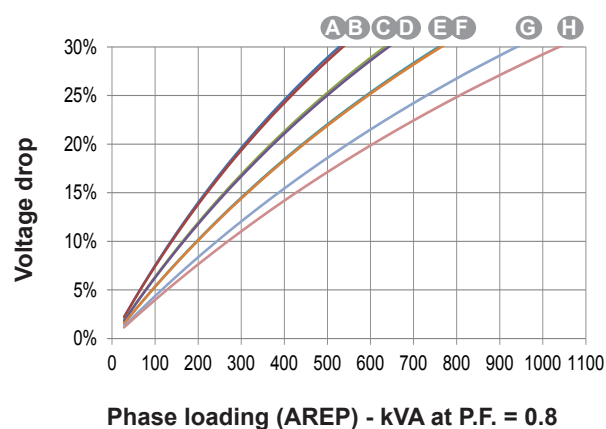
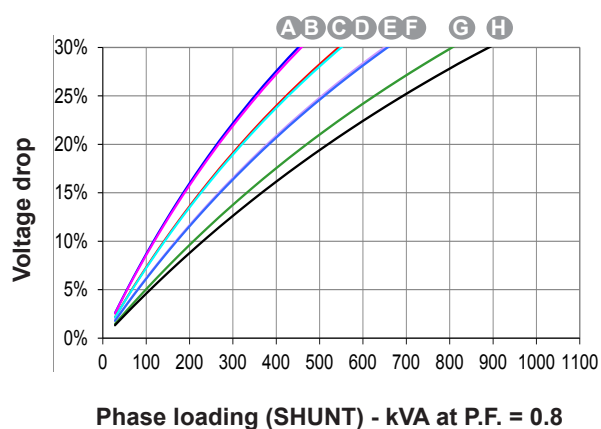
|             |                                                  | A    | B    | C    | D    | E    | F    | G    | H    |
|-------------|--------------------------------------------------|------|------|------|------|------|------|------|------|
| <b>Kcc</b>  | Short-circuit ratio                              | 0.37 | 0.34 | 0.36 | 0.33 | 0.35 | 0.4  | 0.43 | 0.43 |
| <b>Xd</b>   | Direct-axis synchro. reactance unsaturated       | 326  | 362  | 355  | 386  | 361  | 335  | 309  | 303  |
| <b>Xq</b>   | Quadrature-axis synchro. reactance unsaturated   | 166  | 185  | 181  | 197  | 184  | 171  | 157  | 154  |
| <b>T'do</b> | No-load transient time constant                  | 1956 | 1956 | 1983 | 1983 | 2018 | 2033 | 2072 | 2093 |
| <b>X'd</b>  | Direct-axis transient reactance saturated        | 16.6 | 18.5 | 17.9 | 19.4 | 17.9 | 16.5 | 14.9 | 14.5 |
| <b>T'd</b>  | Short-circuit transient time constant            | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  |
| <b>X''d</b> | Direct-axis subtransient reactance saturated     | 13.3 | 14.8 | 14.3 | 15.5 | 14.3 | 13.2 | 11.9 | 11.6 |
| <b>T''d</b> | Subtransient time constant                       | 10   | 10   | 10   | 10   | 10   | 10   | 10   | 10   |
| <b>X''q</b> | Quadrature-axis subtransient reactance saturated | 17   | 18.9 | 18.1 | 19.7 | 18   | 16.4 | 14.7 | 14.2 |
| <b>Xo</b>   | Zero sequence reactance                          | 0.69 | 0.77 | 0.74 | 0.81 | 0.74 | 0.68 | 0.62 | 0.6  |
| <b>X2</b>   | Negative sequence reactance saturated            | 15.2 | 16.9 | 16.2 | 17.6 | 16.2 | 14.8 | 13.3 | 12.9 |
| <b>Ta</b>   | Armature time constant                           | 15   | 15   | 15   | 15   | 15   | 15   | 15   | 15   |

**Other class H / 480 V data**

|               |                                                                     |       |       |       |       |       |       |       |       |
|---------------|---------------------------------------------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| <b>io (A)</b> | No-load excitation current SHUNT/AREP                               | 0.94  | 0.94  | 1.01  | 1.01  | 1.03  | 1.1   | 1.1   | 1.06  |
| <b>ic (A)</b> | On-load excitation current SHUNT/AREP                               | 3.46  | 3.79  | 3.91  | 4.21  | 4.03  | 3.91  | 3.69  | 3.56  |
| <b>uc (V)</b> | On-load excitation voltage SHUNT/AREP                               | 49    | 53.6  | 38.3  | 41.1  | 56.7  | 45.5  | 42.9  | 41.3  |
| <b>ms</b>     | Response time ( $\Delta U = 20\%$ transient)                        | 500   | 500   | 500   | 500   | 500   | 500   | 500   | 500   |
| <b>kVA</b>    | Start ( $\Delta U = 20\%$ cont. or $\Delta U = 30\%$ trans.) SHUNT* | 376   | 376   | 446   | 448   | 532   | 534   | 665   | 742   |
| <b>kVA</b>    | Start ( $\Delta U = 20\%$ cont. or $\Delta U = 30\%$ trans.) AREP*  | 450   | 450   | 537   | 536   | 639   | 640   | 798   | 889   |
| <b>%</b>      | Transient $\Delta U$ (on-load 4/4) SHUNT - P.F.: 0.8 <sub>LAG</sub> | 17.6  | 19    | 18.5  | 19.6  | 18.5  | 19.1  | 17.8  | 17.4  |
| <b>%</b>      | Transient $\Delta U$ (on-load 4/4) AREP - P.F.: 0.8 <sub>LAG</sub>  | 15.5  | 16.7  | 16.3  | 17.3  | 16.7  | 17.2  | 16    | 15.7  |
| <b>W</b>      | No-load losses                                                      | 4522  | 4522  | 4958  | 4958  | 5412  | 5935  | 6673  | 6978  |
| <b>W</b>      | Heat dissipation                                                    | 15376 | 17830 | 19674 | 22244 | 21910 | 22085 | 23012 | 23141 |

\* P.F. = 0.6

## Transient voltage variation 480 V - 60 Hz

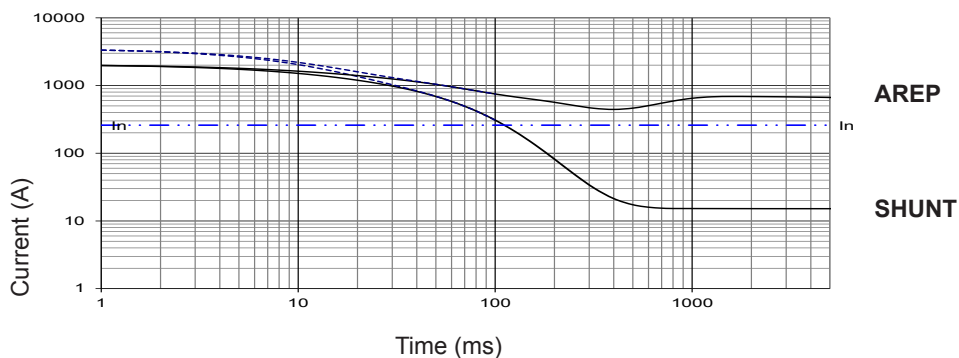


- 1) For a starting P.F. other than 0.6, the starting kVA must be multiplied by  $K = \text{Sine P.F.} / 0.6$
- 2) For voltages other than 480V (Y), 277V ( $\Delta$ ), 240V (YY) at 60 Hz, then kVA must be multiplied by  $(480/U)^2$  or  $(277/U)^2$  or  $(240/U)^2$ .

### 3-phase short-circuit curves at no load and rated speed (star connection Y)

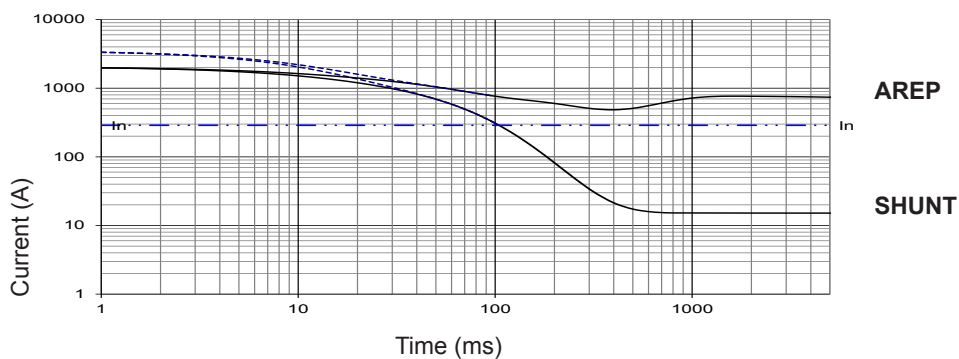
#### TAL 046 A

Symmetrical —  
Asymmetrical - - -



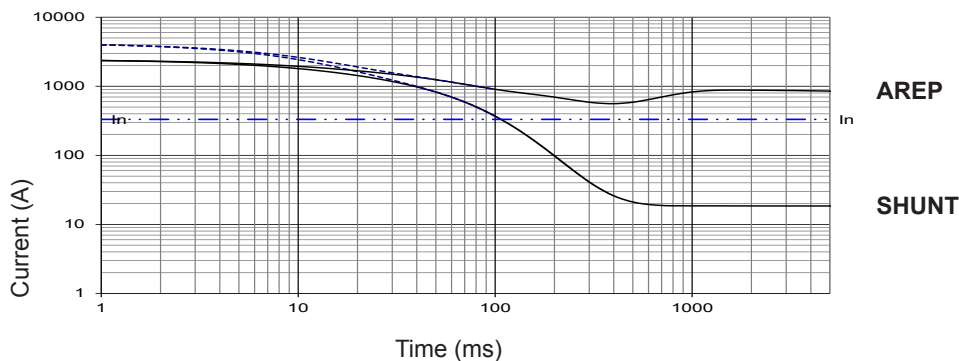
#### TAL 046 B

Symmetrical —  
Asymmetrical - - -



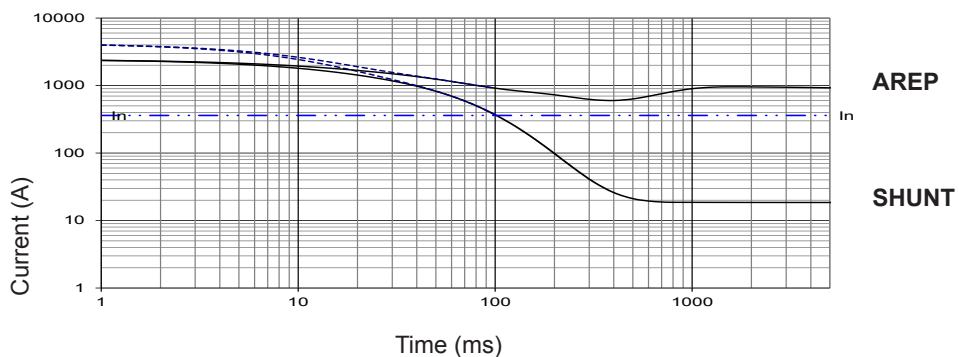
#### TAL 046 C

Symmetrical —  
Asymmetrical - - -



#### TAL 046 D

Symmetrical —  
Asymmetrical - - -



#### Influence due to connection

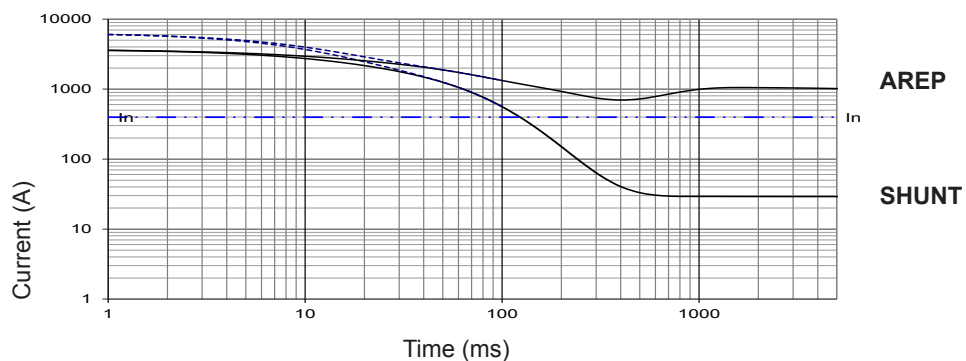
For ( $\Delta$ ) connection, use the following multiplication factor:

- Current value x 1.732.

### 3-phase short-circuit curves at no load and rated speed (star connection Y)

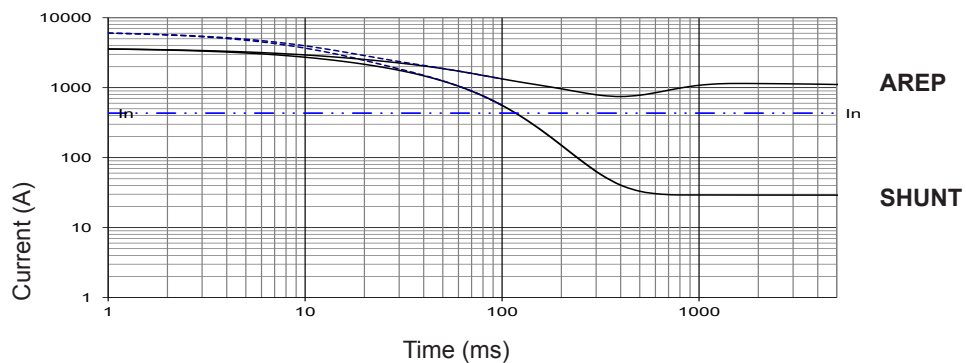
#### TAL 046 E

Symmetrical —  
Asymmetrical - - -



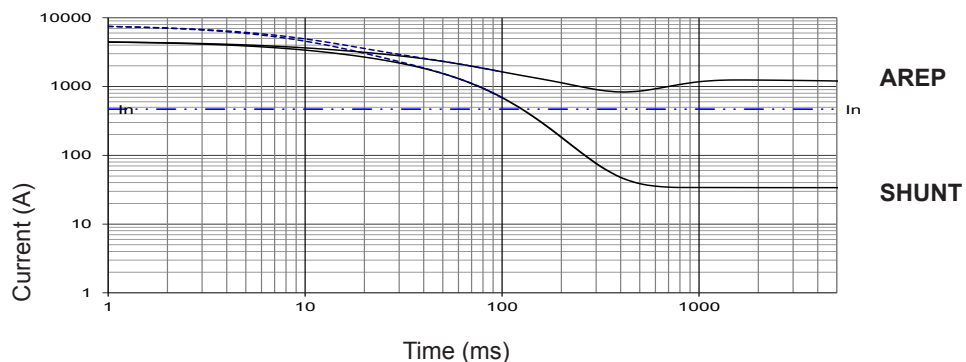
#### TAL 046 F

Symmetrical —  
Asymmetrical - - -



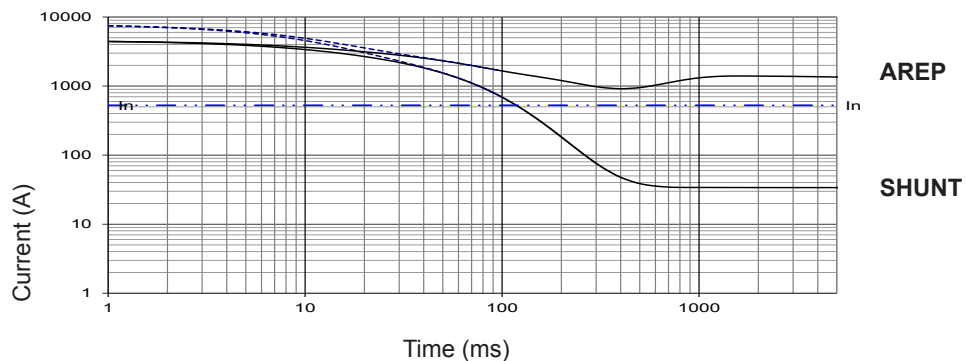
#### TAL 046 G

Symmetrical —  
Asymmetrical - - -



#### TAL 046 H

Symmetrical —  
Asymmetrical - - -

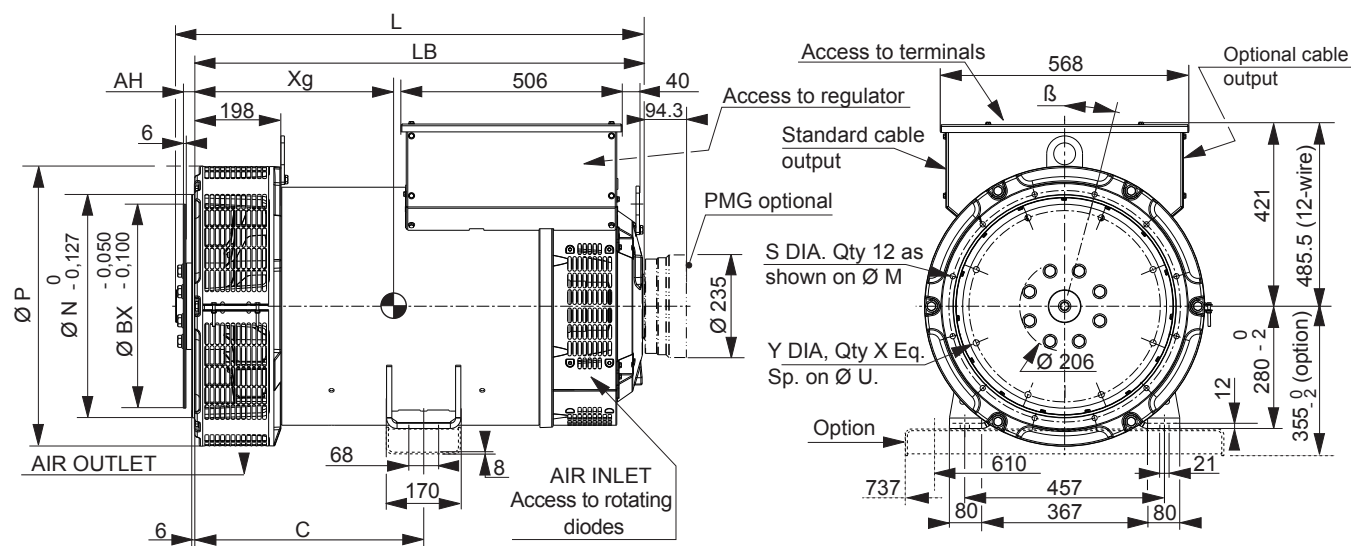


#### Influence due to short-circuit

Curves are based on a three-phase short-circuit.  
For other types of short-circuit,  
use the following multiplication factors.

|                      | 3 - phase | 2 - phase L / L | 1 - phase L / N |
|----------------------|-----------|-----------------|-----------------|
| Instantaneous (max.) | 1         | 0.87            | 1.3             |
| Continuous           | 1         | 1.5             | 2.2             |
| Maximum duration     |           | 1.5             |                 |

## Single bearing general arrangement



**Dimensions (mm) and weight**

| Type       | L without PMG | LB   | Xg  | C   | Weight (kg) |
|------------|---------------|------|-----|-----|-------------|
| TAL 046 A  | 944**/935     | 892  | 408 | 429 | 569         |
| TAL 046 B  | 944**/935     | 892  | 414 | 429 | 599         |
| TAL 046 C  | 944**/935     | 892  | 423 | 429 | 674         |
| TAL 046 D  | 944**/935     | 892  | 423 | 429 | 682         |
| TAL 046 E  | 989**/980     | 937  | 445 | 429 | 754         |
| TAL 046 F  | 989**/980     | 937  | 445 | 429 | 754         |
| TAL 046 G* | 1084**/1075   | 1032 | 493 | 525 | 888         |
| TAL 046 H* | 1084**/1075   | 1032 | 493 | 525 | 888         |

**Coupling**

| Flex plate       | 11 1/2 | 14 | 18 |
|------------------|--------|----|----|
| Flange S.A.E 3   | X      |    |    |
| Flange S.A.E 2   | X      |    |    |
| Flange S.A.E 1   | X      | X  |    |
| Flange S.A.E 1/2 |        | X  |    |
| Flange S.A.E 0   |        | X  | X  |

\* Shaft height = 355 mm optional

\*\* Dimensions with SAE 11 1/2

**Flange (mm)**

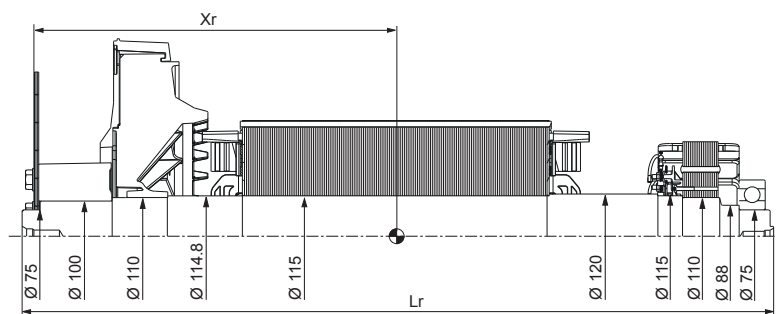
| S.A.E. | P   | N       | M       | S  | β °     |
|--------|-----|---------|---------|----|---------|
| 3      | 641 | 409.575 | 428.625 | 11 | 15°     |
| 2      | 641 | 447.675 | 466.725 | 11 | 15°     |
| 1      | 641 | 511.175 | 530.225 | 12 | 15°     |
| 1/2    | 713 | 584.2   | 619.125 | 14 | 15°     |
| 0      | 713 | 647.7   | 679.45  | 14 | 11° 15' |

**Flex plate (mm)**

| S.A.E. | BX     | U      | X | Y  | AH   |
|--------|--------|--------|---|----|------|
| 11 1/2 | 352.42 | 333.38 | 8 | 11 | 39.6 |
| 14     | 466.72 | 438.15 | 8 | 14 | 25.4 |
| 18***  | 571.5  | 542.92 | 6 | 17 | 15.7 |

\*\*\* Option

## Torsional data



**Centre of gravity: Xr (mm), Rotor length: Lr (mm), Weight: M (kg), Moment of inertia: J (kgm²): (4J = MD²)**

| Type      | Flex plate S.A.E. 11 1/2 |      |     |      | Flex plate S.A.E. 14 |      |     |      |
|-----------|--------------------------|------|-----|------|----------------------|------|-----|------|
|           | Xr                       | Lr   | M   | J    | Xr                   | Lr   | M   | J    |
| TAL 046 A | 413                      | 923  | 243 | 2.46 | 401                  | 923  | 244 | 2.62 |
| TAL 046 B | 413                      | 923  | 243 | 2.46 | 401                  | 923  | 244 | 2.62 |
| TAL 046 C | 420                      | 923  | 255 | 2.64 | 408                  | 923  | 256 | 2.8  |
| TAL 046 D | 420                      | 923  | 255 | 2.64 | 408                  | 923  | 256 | 2.8  |
| TAL 046 E | 460                      | 968  | 304 | 3.28 | 448                  | 968  | 305 | 3.44 |
| TAL 046 F | 460                      | 968  | 304 | 3.28 | 448                  | 968  | 305 | 3.44 |
| TAL 046 G | 508                      | 1063 | 358 | 3.97 | 497                  | 1063 | 359 | 4.13 |
| TAL 046 H | 508                      | 1063 | 358 | 3.97 | 497                  | 1063 | 359 | 4.13 |

**NOTE** : Dimensions are for information only and may be subject to modifications. The torsional analysis of the transmission is imperative. All values are available upon request.



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**Nidec**  
All for dreams

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Moteurs Leroy-Somer SAS. Siège : Bd Marcellin Leroy, CS 10015, 16915 Angoulême Cedex 9, France.  
Capital social : 65 800 512 €, RCS Angoulême 338 567 258.

# DSE7310/20

## AUTO START & AUTO MAINS FAILURE CONTROL MODULES

### FEATURES



The DSE7310 is an Auto Start Control Module and the DSE7320 is an Auto Mains (Utility) Failure Control Module suitable for a wide variety of single, diesel or gas, gen-set applications.

Monitoring an extensive number of engine parameters, the modules will display warnings, shutdown and engine status information on the back-lit LCD screen, illuminated LEDs, remote PC and via SMS text alerts (with external modem).

The DSE7320 will also monitor the mains (utility) supply. The modules include USB, RS232 and RS485 ports as well as dedicated DSENet® terminals for system expansion.

Both modules are compatible with electronic (CAN) and non-electronic (magnetic pick-up/alternator sensing) engines and offer an extensive number of flexible inputs, outputs and extensive engine protections so the system can be easily adapted to meet the most demanding industry requirements.

The extensive list of features includes enhanced event and performance monitoring, remote communications, PLC functionality and dual mutual standby (DSE7310 only) to reduce engine wear.

The modules can be easily configured using the DSE Configuration Suite PC software. Selected front panel editing is also available.

### ENVIRONMENTAL TESTING STANDARDS

#### ELECTRO-MAGNETIC COMPATIBILITY

BS EN 61000-6-2  
EMC Generic Immunity Standard for the Industrial Environment  
BS EN 61000-6-4  
EMC Generic Emission Standard for the Industrial Environment

#### ELECTRICAL SAFETY

BS EN 60950  
Safety of Information Technology Equipment, including Electrical Business Equipment

#### TEMPERATURE

BS EN 60068-2-1  
Ab/Ae Cold Test -30 °C  
BS EN 60068-2-2  
Bb/Be Dry Heat +70 °C

#### VIBRATION

BS EN 60068-2-6  
Ten sweeps in each of three major axes  
5 Hz to 8 Hz @ +/-7.5 mm,  
8 Hz to 500 Hz @ 2 gn

#### HUMIDITY

BS EN 60068-2-30  
Db Damp Heat Cyclic 20/55 °C @ 95% RH 48 Hours  
BS EN 60068-2-78  
Cab Damp Heat Static 40 °C @ 93% RH 48 Hours

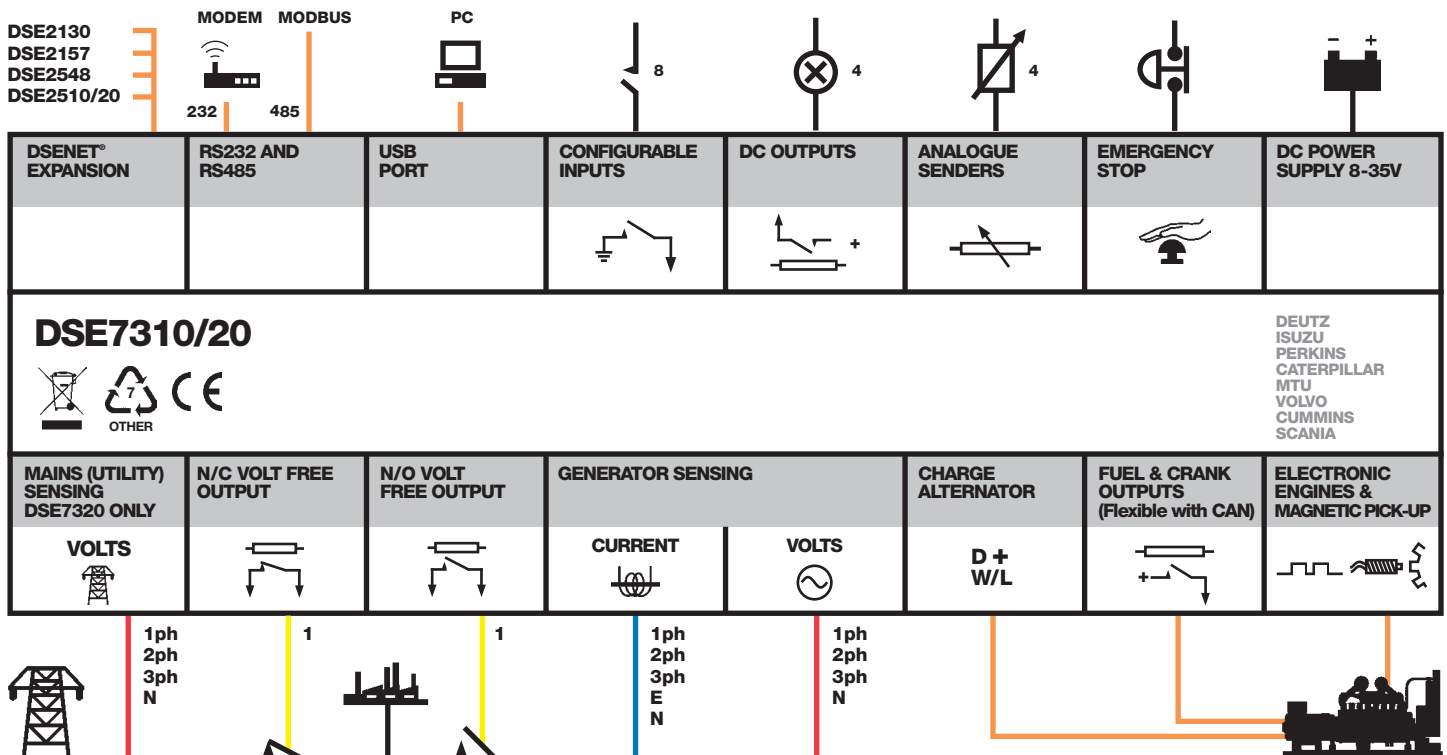
#### SHOCK

BS EN 60068-2-27  
Three shocks in each of three major axes  
15 gn in 11 ms

#### DEGREES OF PROTECTION PROVIDED BY ENCLOSURES

BS EN 60529  
IP65 - Front of module when installed into the control panel with the supplied sealing gasket.

## COMPREHENSIVE FEATURE LIST TO SUIT A WIDE VARIETY OF GEN-SET APPLICATIONS



# DSE7310/20

## AUTO START & AUTO MAINS FAILURE CONTROL MODULES

### FEATURES



#### DSE7310



### KEY FEATURES

- 4-Line back-lit LCD text display
- Five key menu navigation
- Front panel editing with PIN protection
- Customisable status screens
- Power save mode
- Support for up to three remote display units
- 9 configurable inputs
- 8 configurable outputs
- Flexible sender inputs
- Configurable timers and alarms
- 3 configurable maintenance alarms
- Multiple date and time scheduler
- Configurable event log (250)
- Tier 4 CAN engine support
- Integral PLC editor
- Easy access diagnostic page
- CAN and Magnetic Pick-up/Alt. sensing
- Fuel usage monitor and low fuel alarms
- Charge alternator failure alarm
- Manual speed control (on compatible CAN engines)
- Manual fuel pump control
- Engine exerciser
- "Protections disabled" feature
- kW & kV Ar protection

#### DSE7320



- Reverse power (kW & kV Ar) protection
- LED and LCD alarm indication
- Power monitoring (kW h, kV Ar, kV A h, kV Ar h)
- Load switching (load shedding and dummy load outputs)
- Automatic load transfer (DSE7320)
- Unbalanced load protection
- Independent Earth Fault trip
- True dual mutual standby with load balancing timer (DSE7310 only)
- USB connectivity
- Backed up real time clock
- Fully configurable via DSE Configuration Suite PC software
- Configurable display languages
- Remote SCADA monitoring via DSE Configuration Suite PC software
- User selectable RS232 and RS485 communications
- Configurable Gencomm pages
- Advanced SMS messaging (additional external modem required)
- Start & stop capability via SMS messaging
- Additional display screens to help with modem diagnostics
- Idle control for starting & stopping.
- DSENet® expansion compatible

### KEY BENEFITS

- 132 x 64 pixel ratio display for clarity
- Real-time clock provides accurate event logging
- Multiple date and time scheduler
- Set maintenance periods can be configured to maintain optimum engine performance
- Ethernet communications (via DSE860/865 modules), provides advanced remote monitoring at low cost
- Modules can be integrated into building management systems (BMS)
- Increased input and output expansion capability via DSENet®
- Licence-free PC software
- IP65 rating (with supplied gasket) offers increased resistance to water ingress
- PLC editor allows user configurable functions to meet specific application requirements

### SPECIFICATION

#### DC SUPPLY

**CONTINUOUS VOLTAGE RATING**  
8 V to 35 V Continuous

#### CRANKING DROPOUTS

Able to survive 0 V for 50 ms, providing supply was at least 10 V before dropout and supply recovers to 5 V. This is achieved without the need for internal batteries. LEDs and backlight will not be maintained during cranking.

#### MAXIMUM OPERATING CURRENT

340 mA at 12 V, 160 mA at 24 V

#### MAXIMUM STANDBY CURRENT

160 mA at 12 V, 80 mA at 24 V

#### CHARGE FAIL/EXCITATION RANGE

0 V to 35 V

#### MAINS (UTILITY) DSE7320 ONLY VOLTAGE RANGE

15 V - 333 V AC (L-N)

#### FREQUENCY RANGE

3.5 Hz to 75 Hz

#### OUTPUTS

##### OUTPUT A (FUEL)

15 A DC at supply voltage

##### OUTPUT B (START)

15 A DC at supply voltage

##### OUTPUTS C & D

8 A 250 V (Volt free)

##### AUXILIARY OUTPUTS E,F,G,H

2 A DC at supply voltage

#### GENERATOR

##### VOLTAGE RANGE

15 V - 333 V AC (L-N)

##### FREQUENCY RANGE

3.5 Hz to 75 Hz

##### MAGNETIC PICK UP

##### VOLTAGE RANGE

+/- 0.5 V to 70 V

##### FREQUENCY RANGE

10,000 Hz (max)

#### DIMENSIONS

##### OVERALL

240 mm x 181 mm x 42 mm  
9.4" x 7.1" x 1.6"

##### PANEL CUT-OUT

220 mm x 160 mm  
8.7" x 6.3"

##### MAXIMUM PANEL THICKNESS

8 mm  
0.3"

### RELATED MATERIALS

#### TITLE

DSE7310 Installation Instructions  
DSE7320 Installation Instructions  
DSE7200/7300 Quick Start Guide  
DSE7200/7300 Operator Manual  
DSE7200/7300 Configuration Suite PC Manual

#### PART NO'S

053-028  
053-029  
057-101  
057-074  
057-077

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