

Analogue Control Systems



Marine Drive

Generator Set

Dual Fuel
Application

Loc-Control

- ✓ Diesel and Gas Engines
- ✓ Gensets
- ✓ Marine
- ✓ Locomotive



Analogue Control Systems

Although digital control systems are today's dominant technology when it comes to speed control of combustion engines, there is still a great deal of interest in the market for analogue systems, especially for small engines and simple applications.

The advantages lie in the ease of adjustment of control parameters (e.g. speed range, PID and speed droop) and the isochronous operation (zero speed droop).

As well as their excellent controllability characteristics, analogue systems also have another advantage: there is no software, and therefore no programming device is required – just a small screwdriver to adjust the potentiometers described above.

Analogue control systems are particularly well suited for applications that require constant speed control (generator systems).

TEST UNIT PG 01

With the help of the build-in engine simulator it is possible to adjust the speed with the engine stopped. In addition, the unit may be used for checking the governor system before first engine start or in case of service.

Furthermore the unit offers monitoring of the feedback voltage and realtime frequency (speed) measurement.



Test Unit PG 01

For further information please ask for the Manual E 83 008-e, Test Unit PG 01

ACCESSORY PARTS AND UNITS

Available are:

- Speed sensors
- Setpoint adjusters
- Power supplies
- Power supplies with emergency supply
- Synchronisers
- Load measuring units
- Load anticipation units
- Load sharing units
- Speed switches
- Load switches

ELECTRONIC GOVERNOR E 1-F / E 2-F

Usable for an engine power up to 100 KW with governor E 1-F, 150 KW with governor E 2-F

KG 1-03F/KG 2-03F



TECHNICAL DATA E 1-F / E 2-F	
Supply voltage	12 V DC or 24 V DC
Maximum current consumption	approx. 4.5 A
Current consumption in steady state condition	approx. 1 A
Effective rotation at output shaft	68°
Maximum torque at output shaft at E 1-F	0.6 Nm = 0.44 ft lbs with 12 V 0.9 Nm = 0.66 ft lbs with 24 V
at E 2-F	0.9 Nm = 0.66 ft lbs with 12 V 1.4 Nm = 1.03 ft lbs with 24 V
Maximum available torque in steady state condition at E 1-F	0.2 Nm = 0.15 ft lbs with 12 V 0.3 Nm = 0.22 ft lbs with 24 V
at E 2-F	0.3 Nm = 0.22 ft lbs with 12 V 0.46 Nm = 0.34 ft lbs with 24 V

- Non-contact feedback system
- High accuracy
- Low current consumption
- Start fuel limitation
- Speed switch relay

For further information please ask for Manual E 82 001-e, Basic Systems E 1-F / E 2-F

ELECTRONIC GOVERNOR E 6 / E 6V / E 10

Usable for an engine power up to 500 KW with governor E 6, 1000 KW with governor E 10



TECHNICAL DATA E 6 / E 6V / E 10	
Supply voltage	24 V DC
On request	12 V DC
Maximum current consumption	approx. 4.5 A
Current consumption in steady state condition	approx. 1 A
Effective rotation at output shaft	36°
Maximum torque at output shaft at E 6	4 Nm = 2.95 ft lbs
at E 6V	6 Nm = 4.43 ft lbs
at E 10	10 Nm = 7.4 ft lbs
Maximum available torque in steady state condition at E 6	1.3 Nm = 0.96 ft lbs
at E 6V	2 Nm = 1.48 ft lbs
at E 10	3.3 Nm = 2.44 ft lbs

- Non-contact feedback system
- High accuracy
- Low current consumption
- Start fuel limitation on request

For further information please ask for Manual E 87 012-e, Basic Systems E 6 / E 6V / E 10

ELECTRONIC GOVERNOR E 16 / E 30 / E 40

Usable for an engine power up to 2000 KW with governor E 16, 4000 KW with governor E 40



TECHNICAL DATA E 16 / E 30 / E 40	
Supply voltage	24 V DC
Maximum current consumption	approx. 4.5 A
Current consumption in steady state condition	approx. 1 A
Effective rotation at output shaft	42°
Maximum torque at output shaft	
at E 16	15 Nm = 11 ft lbs
at E 30	28 Nm = 20.7 ft lbs
at E 40	44 Nm = 32.5 ft lbs
Maximum available torque in steady state condition	
at E 16	5 Nm = 3.69 ft lbs
at E 30	9 Nm = 6.64 ft lbs
at E 40	14.5 Nm = 10.7 ft lbs

- Non-contact feedback system
- High accuracy
- Low current consumption
- Start fuel limitation on request

For further information please ask for Manual E 87 009-e, Basic Systems E 16, E 30, E 40

ELECTRONIC GOVERNOR E 2010 / E 2040 / E 2080

Usable for an engine power up to 200 KW with governor E 2010, 800 KW with governor E 2040, 1000 KW with governor E 2080



TECHNICAL DATA E 2010 / E 2040 / E 2080	
Supply voltage	24 V DC
on request	12 V DC
Maximum current consumption	approx. 4.5 A
Current consumption in steady state condition	approx. 1 A
Effective rotation at output shaft	36°
Maximum torque at output shaft	
at E 2010	1.4 Nm = 1.03 ft lbs
at E 2040	6.5 Nm = 4.81 ft lbs
at E 2080	11 Nm = 8.14 ft lbs
Maximum available torque in steady state condition	
at E 2010	0.45 Nm = 0.35 ft lbs
at E 2040	2.2 Nm = 1.63 ft lbs
at E 2080	4 Nm = 2.95 ft lbs

- Non-contact feedback system
- High accuracy
- Low current consumption
- Start fuel limitation on request

For further information please ask for Manual E 94 004-e, Basic Systems E 2010, E 2040, E 2080

ORION ANALOGUE CONTROL UNIT KG-LC-D

A new low cost generation. For small and medium sized diesel & gas engines. Optional rotary or linear actuators



KG-LC-D



StG 3005



LStG 25

TECHNICAL DATA Control Unit KG-LC-D

Supply voltage	24 V DC
Current consumption	max. 5 A
Steady state consumption	max. 1.7 A
Control frequency	3100 up to 7000 Hz
Steady state variation	+/- 0,25%
Protection grade	IP 00
Weight	approx. 0.5 kg

For further information please ask for Manual DG 06 005-E, ORION, LOW COST GOVERNOR

ACTUATOR LSTG 25

- *linear version*

Technical data LSTG 25

Stroke	19.5 mm
Force in stop position	10 N
Force in start position	18 N
Response time 0-100% without load	70 msec
Current consumption of whole governor	approx. 3 A
Storage temperature	-55° up to + 110°C
Ambient temperature in operation	-25° up to + 95°C
Humidity	up to 98%
Protection grade (housing)	IP 65
Weight	0.9 kg

ACTUATOR STG 3005

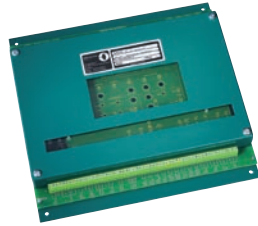
- *rotary version*

TECHNICAL DATA STG 3005 for 2q-operation

Magnet material	NFB or Ferrit
Output shaft rotation angle	53°
Max. torque at output shaft in stop direction	0.7 Nm (NFB) 0.3 Nm (Ferrit)
Max. torque at output shaft in start direction	0.55 Nm (NFB) 0.15 Nm (Ferrit)
Response time 0-100% without load	70 msec
Current consumption of whole governor:	approx. 3 A
Storage temperature	-40° up to + 130°C
Ambient temperature in operation	-40° up to + 95°C
Humidity	up to 98%
Protection grade (housing)	IP 65
Weight	0.8 kg

ACCESSORIES

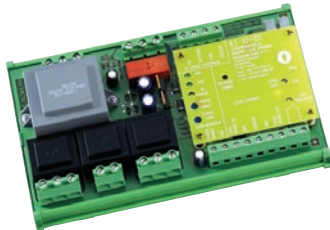
AT 01 ANALOGUE GENERATOR MANAGEMENT



The AT 01 unit includes a synchroniser, a load sharer, a load ramp and integrated soft loading.

- Application: power generation
- Detailed information/PDF: Leaflet THESEUS analogue, Manual THESEUS AT 01

AT 10-01 ANALOGUE GENERATOR MANAGEMENT



The AT 10-01 is a cost-effective unit for single phase application. It includes a synchroniser, a load sharer and a load ramp.

- Application: power generation
- Detailed information/PDF: Leaflet THESEUS AT 10-01

LMG 10-01 ANALOGUE ISOCHRONOUS KW LOAD SHARING UNIT



This unit replaces the LMG 03 load sharer and has integrated soft loading.

- Application: power generation
- Detailed information/PDF: Manual LMG 10-01

SYG 02 ANALOGUE SYNCHRONISER UNIT



The SyG 02 synchroniser has three-phase voltage detection with frequency and phase control over a paralleled generator.

The unit has direct control of the generator speed and will pull a generator into synchronism from within +/- 2 Hz of synchronous frequency.

- Application: power generation
- Detailed information/PDF: Manual SYG 02

LMG IF-02 LOAD SHARE INTERFACE UNIT



The Load Share Interface Unit LMG-IF-02 is used to couple load share lines of control systems, operating at different voltage levels.

- Application: power generation
- Detailed information/PDF: Manual LMG-IF-02

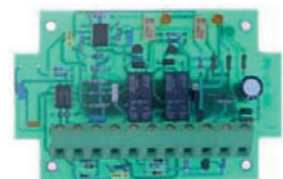
LR 01 RAMP GENERATOR UNIT



Accessory for existing LMG 03 load share units to ramp up or down the load of generators, connected to the grid. Also usable as a speed ramp unit for analogue speed governors.

- Application: power generation

LSCHG 02 2 CHANNEL LOAD SWITCH UNIT



Accessory for load sensing, based on an actual load signal of 0 ... 5V.

- Application: power generation

LKG 02 **LOAD** **IMPORT/EXPORT** **CONTROLLER**



Accessory for LMG 10-01. LKG 02 controls load import / export.

- Application: power generation

GSLU 01 **RAMP** **GENERATOR**



Accessories for LMG 10-01 the GSLU 01 unit allows parallel engines to isochronously load ramp in mains parallel and island applications.

- Application: power generation
- Detailed information/PDF:
Leaflet GSLU 01, Manual GSLU 01

SPAG 03 **VOLTAGE** **MATCHING** **UNIT**



The voltage matching unit will match the voltages between the generator and a BUS. The output is a raise / lower signal which will interface to the AVR motor potentiometer.

- Application: power generation

PFC 01 **POWER FACTOR** **CONTROLLER**

The power factor controller allows the control of reactive load via a motor potentiometer connected to the generator AVR.

- Application: power generation

SA 02 **LOAD ANTICIPATION** **UNIT**

An accessory unit for analogue speed governors to improve load acceptance and load shed compensation of single gensets in island operation. It reduces speed under- /overshoots independent from governor PID adjustment.

- Application: power generation

LTG 03 **DEVICE FOR MECHANICAL** **LOAD SHARING**

The LTG 03 provides precise load sharing for installations with two engines on the same shaft, using analogue control systems.

- Application: marine applications

BSBG 01 **ANALOGUE** **SPEED RAMP**



Accessory for existing LMG 03 load share units to ramp up or down the load of generators connected to the grid.

Also usable as a speed ramp unit with analogue speed governors.

- Application: any speed control

SFBG 03 **ANALOGUE** **START FUEL** **LIMITER OR LOAD** **LIMITER**



Additional functionality for control units in the range of KG 6 to KG 40.

- Application: any speed control



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