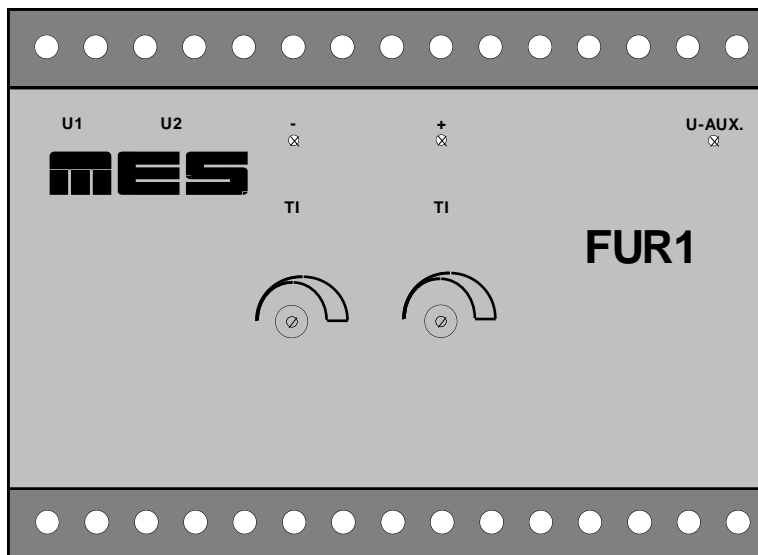


## Load Controller

## FUR1

Vision06 31.10.2007



### FEATURES

- measuring inputs 0-10 VDC
- integrated PI-controller
- internal and external reference value pre-set
- separate setting of control pulses
- LED-operation indications
- compact design

[view 1](#)

### 1.0 SCOPE OF APPLICATION

The **FUR1** is used in cases of automatic active load of regulation generator parallel operation with generators having equal power output or in cases of automatic active load regulation at mains parallel operation of one generator.

This controller may be applied for other tasks as well, e.g. in case of  $\cos\phi$ -regulation.

## 2.0 METHOD OF OPERATION

The PI-controller compares the voltages of both measuring inputs and emits corresponding control pulses. An external potentiometer for pre-set of a reference value may be connected as well (view. 2, 4 and 5) . Furthermore the reference value may be also limited by means of an internal potentiometer. The desired function is obtained by corresponding wiring.

The width of the emitted control pulses depend on the measuring signal difference between U1 and U2. The bigger the difference, the longer the pulse will be. Furthermore the pulse width may be varied by both potentiometers (TI), in order to obtain an adaptation of the FUR1 to the actuating speed of the different speed control governor systems, available on the market.

Furthermore the pulse sequence is changing proportionally to the measuring signal difference.

The measuring inputs are provided for 0-10 VDC signals and are to be connected via corresponding measuring transducers.

## 3.0 FUNCTION

### 3.1 Commissioning

The FUR1 has to be connected according to the terminal allocation (view 2).

After connection of the auxiliary voltage the LED „U-AUX.“ lights and control action can start. The potentiometers are obtainable after removal of the front cover.

Setting of the pulse width takes place via the potentiometers TI- and TI+ (view 2):

Potentiometer TI- = pulse width for the negative control pulse  
Potentiometer TI+ = pulse width for the positive control pulse

The sensitivity against deviation of the measuring voltages U1 and U2 are to be adjusted by the two potentiometers  $\Delta U-$  and  $\Delta U+$  (view 2):

Potentiometer  $\Delta U-$  = sensitivity for the negative control pulse  
Potentiometer  $\Delta U+$  = sensitivity for the positive control pulse

The smallest deviation of the reference value U1 against the actual value U2, on which control action is still possible, amounts  $\Delta U > 0,03$  V. In case this sensitivity is required, so the corresponding potentiometers must be turned to the right. If the control action shall be less sensitive, so the potentiometers  $\Delta U-$  or  $\Delta U+$  must be turned to the left. At the left limit stop on which control action starts working, the voltage value  $\Delta U$  amounts  $> 0,7$  V.

### 3.2 Generator parallel operation

The **FUR1** compares the active power of two generators and emits the corresponding control pulses to the speed governor of the genset to be regulated.

- U1 = 0-10 VDC = the active power of the guiding genset (reference value)
- U2 = 0-10 VDC = the active power of the genset to be regulated (actual value)

By means of the two potentiometers TI- and TI+ the pulse width is to be adjusted in such a manner that the active power is adapted with a brisk speed and without overshooting. ([view 3](#))

### 3.3 Mains parallel operation

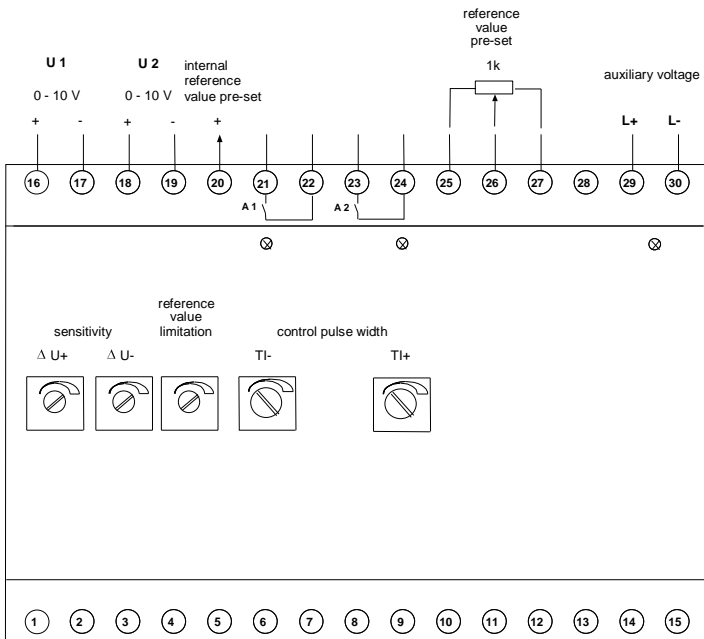
The load controller **FUR1** compares the active power of the generator with a pre-set reference value. The internal reference value pre-set has to be limited by means of the internal potentiometer "reference value imitation" in order to prevent a regulation into the overload range.

The **FUR1** emits corresponding control pulses to the speed governor system of the genset, so that this is regulated to the desired active power.

- U1 = 0-10 VDC = internal reference value pre-set (reference value)
- U2 = 0-10 VDC = the active power of the genset to be regulated (actual value)
- terminals 16 and 20 to be bridged

By means of the two potentiometers TI- and TI+ the pulse width is to be adjusted in such a manner that the active power is adapted with a brisk speed and without overshooting. ([view 4](#))

## 4.0 CONNECTING DIAGRAM



### Reference value pre-set:

The range can be set 0-100%, referred to the value pre-set on the ref. value limitation.

### Outputs:

A1: control pulse -  
A2: control pulse +

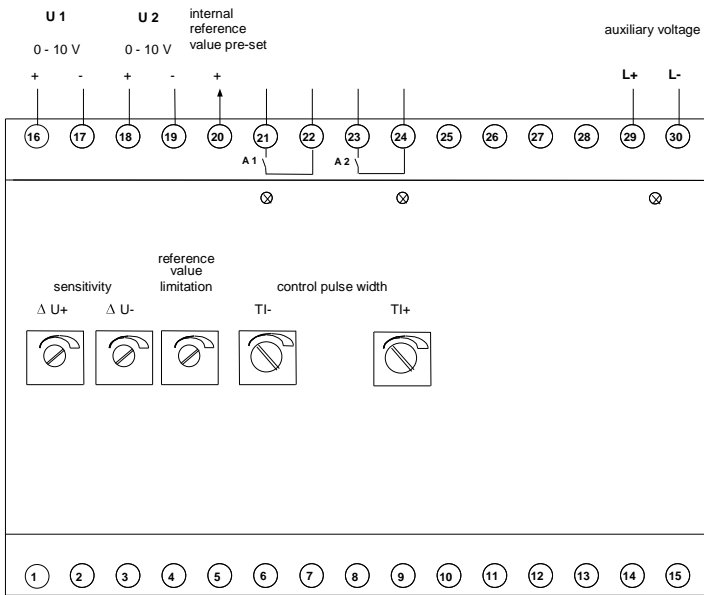
### Inputs:

U1=0-10VDC=active power of guiding genset  
U2=0-10VDC=active power of genset to be regulated  
terminal 25/26/27: 1K Ohm  
terminal 25 : +  
terminal 26 : 0-10V  
terminal 27 :-

The potentiometers are obtainable after removal of the front cover.

[View 2](#)

## 4.1 Connecting examples



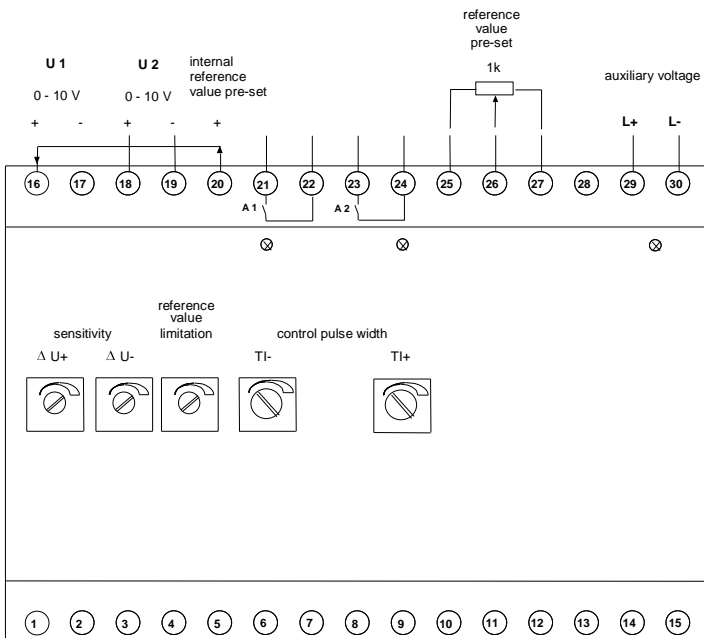
**Outputs:**

A1: control pulse -  
A2: control pulse +

**Inputs:**

U1=0-10VDC=active power of guiding genset  
U2=0-10VDC=active power of genset to be regulated

**view 3: Generator-parallel operation**



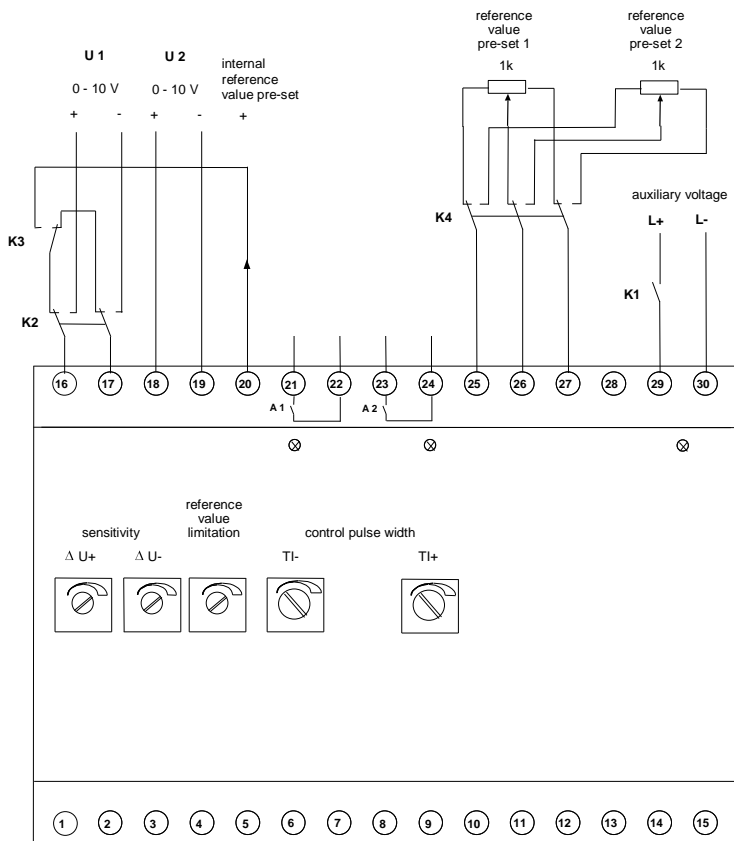
**Outputs:**

A1: control pulse -  
A2: control pulse +

**Inputs:**

U1=0-10VDC=active power of guiding genset  
U2=0-10VDC=active power of genset to be regulated

**view 4: Mains- parallel operation with internal load pre-set**



**Outputs:**

A1: control pulse -  
A2: control pulse +

**Inputs:**

U1=0-10VDC=active power of guiding genset  
U2=0-10VDC=active power of genset to be regulated

**Abb. 5: Generator loading and unloading and change-over to a second reference value**

**Legend to view 5:**

K1 load controller ON / OFF

zero-load regulation (unloading) :

- K2 de-energized
- K3 de-energized
- K4 no function

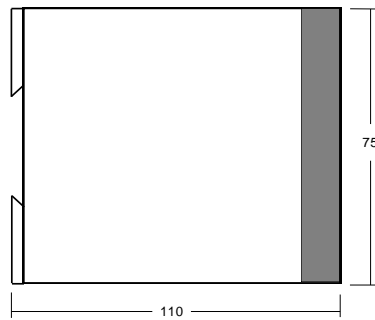
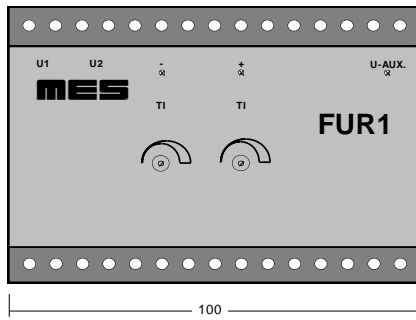
reference value pre-set-control, mains parallel operation (loading) :

- K2 de-energized
- K3 energized
- K4 de-energized = reference value pre-set 1
- K4 energized = reference value pre-set 2

External reference value pre-set, e.g. generator parallel operation:

- K2 energized
- K3 no function
- K4 no function

## 5.0 DIMENSIONS



view 6

## 6.0 TECHNICAL DATA

Auxiliary voltage	19 - 32 V DC
Analogue inputs	terminals 16 – 19 : 0 – 10 V DC ; Burden 125 k $\Omega$ terminals 25 – 27 : potentiometer 0 – 1 k $\Omega$
Consumption	approx. 3 VA
Sensitivity	potentiometer $\Delta U$ of $\geq \pm 0.03$ – $\geq \pm 0.7$ V
Relay outputs	230 V AC/DC, 2 A
Test voltage	2.5 kV
Ambient temperature	0 ... +50 °C
Casing	plastic Makrolon 8020 grey / VDE 0100 / VBG4
Dimensions	W100 x H75 x D110 mm
Mounting	on standard rail according DIN 50022 <b>or screw mounting</b>
Degree of protection	IP 20
Weight	300 g
Mounting position	any
Regulations	VDE 0160 / EN50178 VDE 0435 part 303 VDE 0110 IEC 255-6

*Subject to technical modifications!*

This device replaces our former type MPA-SP.



MES Energy GmbH  
Kisdorfer Weg 36-38  
D - 24568 Kaltenkirchen  
Tel.: + 49 4191 809 – 800  
Fax: + 49 4191 809 – 851  
E-mail: [info@mes-energy.com](mailto:info@mes-energy.com)  
Internet: <http://www.mes-energy.com>