Module Description

Application
The DC-DC converter module 89 NG06 is used with the PROCONTROL system for supplying the IO-bus terminations. It generates the stabilized +11 VDC operating voltage (UH) from an unstabilized DC input voltage in the range of 18 V ... 33 VDC. The module supplies a rated current of 6 A on the output side.

Features
The module functions internally as an in-phase regulator with a clock frequency of approx. 50 kHz.

The controlled output voltage is generated in non-floating form from an input voltage with a large tolerance range.

The module has particular monitoring functions. The operating status and disturbances can also be indicated and annunciated.

Two modules 89 NG06 can be connected in parallel on the output side in order to boost the power.

Description
The following description should be read in conjunction with the function diagram.

Voltage input
The unregulated DC voltage (in the range 18 ... 33 VDC) is supplied to the module via the terminals +UE and -UE.

The input voltage is fused on the module.

Regulating section
The central part of the module is the regulating section. This unit which works as an in-phase regulator (clock frequency approx. 50 kHz) generates a stabilized DC voltage of +11 V on the output side together with a subsequent smoothing stage. This is provided at the outputs +UA und -UA.

The 11 VDC operating voltage present at the load is supplied to the regulator for comparison purposes via the inputs +U and -U. If there is a change in the load (e.g. by the addition of electronic modules), the regulator is then able to correct the operating voltage as required.

If the two modules 89 NG06 are connected in parallel on the output side, the terminals PS must be connected with each other.

The two regulators are synchronized by means of the appropriate parallel switching logics.

Monitoring
The monitoring facility takes over the monitoring for overvoltages and undervoltages in the regulator.

If the upper tolerance limit is exceeded, the GTO thyristor is triggered (corresponds on the output side to a short circuit) and the regulator is blocked. This is also annunciated (see "Annunciation functions") with the message "Undervoltage tolerance limit violated".

If this lower tolerance limit is violated, there is no switchoff, but an annunciation is initiated.

Two methods of reclosing are possible after a module has been automatically switched off:
— by switching off and reclosing the mains supply
— by means of external remote switching. A switch is connected to terminals AS and -UE for this purpose.

Annunciation functions

Annunciation on the module
A green light emitting diode ON is located on the front panel of the module. It emits a steady light for as long as the output voltage stays in the permissible range.

If the monitoring facility responds (violation of the upper or lower tolerance limit), the light emitting diode is set back.

Annunciation from the module
A relay with a floating changeover contact is located on the module. It is actuated by the monitoring facility.

An annunciation is output via contact outputs K1, K2 and K3 as to whether the output voltage is within the permissible tolerance range or whether one of the limits has been violated.
Function diagram
Mechanical design

Board size: 3U, 2T, 160 mm deep
Connector: to DIN 41 612, 15-pole, edge connector, type H
Weight: approx. 0.74 kg

Mechanical strength
Type of protection: to DIN 400 40, Class Z
Cooling: IP 00
Fuse: Internal convection or external ventilation (see. "Ambient values")

Size: ø 6.3 x 32 mm

Technical data

Input values

+UE/-UE — Voltage input
Operating range: 24 VDC
Input current: 18 ... 33 VDC
Fuse: max. 6 A
+Fu/-Fü — Sensor input
UO: T 6.3 A/250 G
IIO: approx. 6 V
AS — Switchoff input
UO: approx. 5 mA
SL — Earth conductor terminal

Output values

+UA/-UA — Voltage output
Rated voltage: 11 VDC
permanently set to: 10.9 ... 11.1 V
Rated current: 6 A
Power output: 66 W
Efficiency: 70 %
Ripple (peak/peak): ≤ 100 mV

Deviation, static
(Influence of power supply and temperature)
with rated load

Deviation, dynamic
with 30 % load change
between (10 — 100 %) \( I_N \)

Controllable voltage drop
on the load line

Short circuit current

Characteristic

The voltage output is open-circuit-proof, short-circuit-proof and overload-proof

0.1 V/line

approx. \( 1.2 \times I_N \) for \( T_U = 20 ^\circ C \)

= \( I_N \) for \( T_U = 70 ^\circ C \)

Constant current

Periodic load changes 0 ... 100 % can cause voltage drops with load change frequencies of 0.5 ... 50 Hz
K1, K2, K3  Annunciation contacts
Switching voltage : 250 VDC
Permanent current : 7.5 A
Switching capacity :
  - 120 W for U = 30 VDC
  - 50 W for U = 250 VDC
  - 3750 VA for U = 250 VAC

PS  Connection terminal for parallel circuit

Monitoring values
Response time constant : 3.3 ms
Response threshold
  - Overvoltage : 12.0 ... 14.5 VDC
  - Undervoltage : 7.9 ... 9.6 VDC

Ambient values
Operating temperature constant with external ventilation
  - with V = 1 m/s and $I_A = I_N$ : -25 °C ... +70 °C
  - with internal convection and $I_A = 0.25 I_N$ : -25 °C ... +70 °C
  - with internal convection and $I_A = 0.5 I_N$ : -25 °C ... +60 °C
  - with internal convection and $I_A = 0.75 I_N$ : -25 °C ... +50 °C
  - with internal convection and $I_A = I_N$ : -25 °C ... +40 °C
Storage and transport temperature : -40 °C ... +80 °C
Humidity resistance : Class F
Operating mode : On-period = 100 %
Operating altitude : = 2200 m
Insulation : Protection class I, Insulation grp.. C
Switchoff input AS : open = module switched on

Test voltage
Contact to environment : 2.5 kV

Leakage path
Contact to environment : = 4 mm

Ordering data
Module 89 NG06 : GJR4 5009 00R3

Technical data are subject to change without notice.