

# Multi-function Card

ESSK 107



- semiconductor output stages
- 3 power outputs
- 1 current measurement input
- 2 analogue / digital inputs
- 1 digital input
- 5 adjustments
- power supply 12 ... 30 V

## 1 Description

### 1.1 General

The ESSK 107 push-in card is a digital, multifunction device. It has 3 power outputs, 2 analogue/digital inputs, 1 digital input and a current measurement input to enable current compensation. The outputs are switched by semiconductor end stages and consequently they do not suffer from the wear problems associated with contact devices.

The card is used to control a double solenoid proportional directional valve (1 axis) as well as a single solenoid on/off valve (ex. a 3/2 seat valve). Any device with an output voltage of 4,5 +/- 3,5 V can be used as the control signal source. The card is also provided with an input terminal for an enable signal. As soon as the joystick handle is moved, the on/

off valve is energised and the proportional valve is actuated in accordance with the amount of movement.

### 1.2 Application example

- Processing signals from joysticks for controlling proportional and on/off directional valves in mobile hydraulic systems.
- Agricultural machinery
- Municipal vehicles
- Forestry machines
- Construction machinery

## 2 Technical data

General Characteristics	Description, Value, Unit
Power supply	12 V... 30 V DC, smoothed; Ripple < 10 %, Power supply terminals are inversed polarity-protected
Current consumption ( without solenoid)	max. 80 mA
Reference voltage	9 V (is available for external use) maximum loading 10 mA
Demand signal input Input impedance approx. 100 kΩ	standard = 4,5 V ± 3,5 V /01 = 4,5 V ± 0,7 V /02 = 2,5 V ± 2 V
Digital input	Input active low: 0 V...1,5 V high: 3,5 V... 5 V
Proportional outputs adjustable minimum current ( $I_{min}$ ) adjustable maximum current ( $I_{max}$ ) max permissible output current dither frequency ramp	0,02 - 1,2 A $I_{min} + 0 - 1,5 A$ 2,5 A 140 Hz 0 - 5 seconds
ON/OFF, max permissible output current	3 A

Reference: 100-P-700033-EN-05

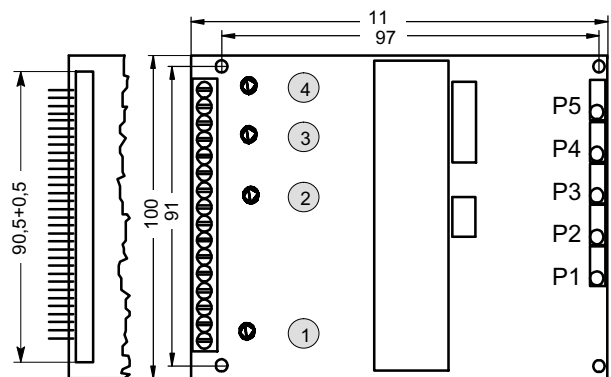
General Characteristics	Description, Value, Unit
Diagnostics	1 LED for each of: reference voltage 9 V      yellow (1) proportional output      green (2 + 3) ON/OFF output      green (4)
Temperature range	-20° ... +50°C
Enclosure protection	IP 00 (non-encapsulated, without housing)
Dimensions	approx. 100 x 110 x 30 mm
Mass	approx. 150g non-encapsulated, 300 g encapsulated
Connections	options: connector DIN 41617-S31M or screw terminals
Cable length and section	for 1 mm <sup>2</sup> section wire, max. cable length is 10 metres

### 3 Function and dimension

Trim potentiometer max. 20 turns

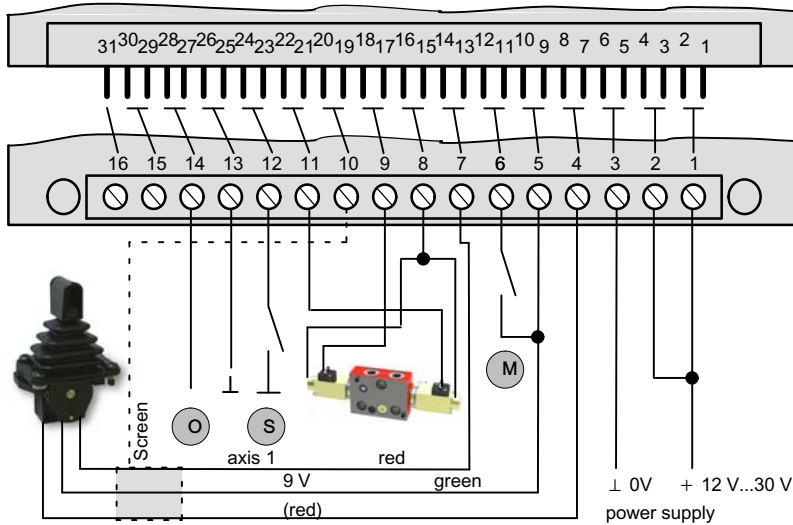
✓ +      -

- P5 = minimum current ( $I_{min}$ )
- P4 = maximum current, first axis ( $I_{min}$ )
- P3 = maximum current, second axis ( $I_{max}$ )
- P2 = rampe
- P1 = zero position (factory preset)



1	LED Reference voltage (Power)	3	LED Proportional solenoid A
2	LED Proportional solenoid B	4	LED ON / OFF output

## 4 Connection diagram (example)



O	On/Off output $I_{max}$ 3A
M	Memory Function (electronic detent) Option: at needs connect

S	Enable signal: Switch or connecting with $\perp$ Switch ON (0V) → Card enabled Switch OFF → Card disabled
---	--



- When the pin connector is used, the power supply and the solenoid loads must be connected using both pins.
- Use screened cable for all demand-signal lines. The screen must be bonded to the power-supply negative.
- It is not possible to energise both proportional solenoids at the same time.

## 5 Initial start-up



Connect the card in accordance with the connection diagram.



Yellow LED (E) does not light.

- Check the power supply.



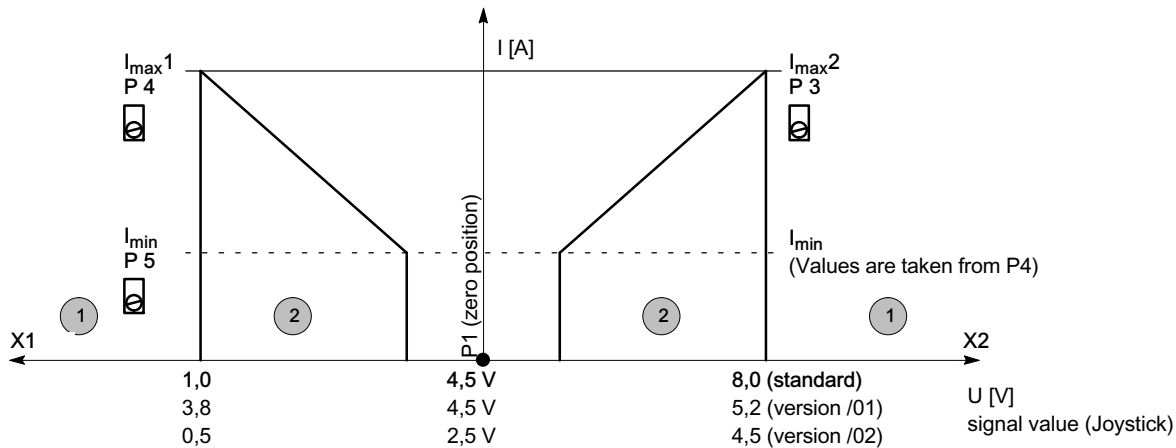
## 6 Setup procedure



If the joystick's permissible range is exceeded, the card interprets this as a wire break and the outputs are disabled.



P1, the null position, is factory-set to the reference voltage.



**1** Switch-off due to broken cable

**2** hydraulic opening range

10. The following adjustments are available:  $I_{min}$  (common),  $I_{max}$  (solenoid A),  $I_{max}$  (solenoid B) and the null position of the signal source.
11. Turn the adjusting screw on potentiometer P2 anti-clockwise to its end-stop.
12. Move joystick on axis X1 until the green LED is on. Using P5, and while decreasing the signal, set the required minimum value ( $I_{min}$ ).
13. Move joystick full stroke on axis X1. Using P4, and while increasing the signal, adjust the maximum current ( $I_{max1}$ ) until the selected function gets started.
14. Move joystick full stroke on axis X2. Using P3, and while increasing the signal, adjust the maximum current ( $I_{max2}$ ) until the required function is established.

15. Re-check steps 3 - 5 and readjust as necessary (fine tuning). Using P2, set the required ramp value.



The trim potentiometers (P1) that are sealed with colour spots are preset in the factory.

## 7 Ordering code

		<b>E</b>	<b>S</b>	<b>S</b>	<b>K</b>	<b>1</b>	<b>0</b>	<b>7</b>	<b>-</b>	<b>9</b>	<b>1</b>	<b>*</b>	<b>*</b>	<b>*</b>	<b>/</b>	
Electronic product																
Push-in card	=	S														
Proportional amplifier	=	SK														
Typ																
Desing with pin connector	=	90														
with screw terminals (standard)	=	91														
with pin connector; potted	=	80														
with screw terminals; potted (stanard)	=	81														
Power supply 12 ... 30 V DC = ***																
special applications /																
	/ without	4,5 V ± 3,5 V														
	/ 01	4,5 V ± 0,7 V														
	/ 02	2,5 V ± 2 V														

## 7.1 Joystick Selection table

Code	Signal Value	title Code	Quantity per Joystick
FGE1-**-G**/JC1	4,5 ± 3,5V	ESSK107-xx***	1
FGE*-33-G**/JS3	2,5 ± 2V	ESSK107-xx***/02	2
FGE*-MA3HA1VG**/JS3	2,5 ± 2V	ESSK107-xx***/02	2
FGE*-MT1V***G**/JS3	2,5 ± 2V	ESSK107-xx***/02	2

Technical information about joysticks, see datasheet 100-P-700051

## 7.2 Adjustments

The ESK 107 multi-function card can be supplied in an enclosure. Various auxiliary functions can also be supplied. Various types of joysticks are available for generating the demand signals. As an alternative to the enclosure, a suitable cardholder can be supplied, as can an appropriate

snap-in retaining foot. To connect the solenoids, use type GDM 309 solenoid plugs. In the event of valve malfunctions that are caused by long power leads, use GDM 209D solenoid plugs.

Type	Data sheet	Ordering code	Function
Joystick FGE1-**-G**/JC1	100-P-700051	100020513	Model with one-axis gate
Joystick FGE*-33-G**/JS3	100-P-700051	100232813	Model with cyl. grip, buttons & dead-man switch
Joystick FGE*-MA3HA1VG**/JS3	100-P-700051	100013668	Model with multi-function grip, 4 buttons, 1 front switch, 1 rear switch
Joystick FGE*-MT1V***G**/JS3	100-P-700051	100029699	Model with with multi-function grip, 4 buttons, 1 front switch
Wiring flex. 0.25 mm <sup>2</sup>		100606039	Specify length in clear text
cable OEZ-J2 x 1,0 mm <sup>2</sup>		100604380	Specify length in clear text
cable OEZ-J2 x 1,5 mm <sup>2</sup>		100604310	Specify length in clear text
Cardholder	100-P-70010	100606201	
Snap-in retaining foot	100-P-70010	100606202	
solenoid plug GDM309	100-P-70010	100064970	
solenoid plug GDM209D	100-P-70010	100014130	
Enclosure with front panel for installing the ESK 107 and any options			on request

## 8 Fault finding

