Operating Manual

DSV-6E

Content

1 General

1.1 For Information

- These operation instructions contain important information on handling the strain gauge summing amplifier. Working safely requires that all safety instructions and work instructions are observed .
- Skilled personnel must have carefully read and understood the operating instructions prior to beginning any work.
- The operating instructions are part of the product and must be kept in the immediate vicinity of the summing amplifier and readily accessible to skilled personnel at any time.
- Observe the relevant local accident prevention regulations and general safety regulations for the summing amplifier‘s range of use.
- If the serial number gets illegible (e. g. by mechanical damage), the retraceability of the instrument is not possible any more.
- The summing amplifiers, described in this operating manual, are carefully designed and manufactered using state-of-the-art technology. Every component undergoes strict quality inspection in all stages of manufacture.
- The manufacturer‘s liability is void in the case of any damage caused by using the product contrary to ist intended use, non-compiliance with these operating instructions, unauthorised modifications to the summing amplifier or assignment of insufficiently qualified skilled personnel.

1.2 Signs, abbreviations

Warning!
A non-observance can cause injuries to persons and/or the demolition of the device.
There can be a dangerous to life.

Attention!
A non-observance can cause a faulty operation of the device or lead to property damage.

Information!
A non-observance can have influence on the operation of the device or cause unintentional reactions of the device.

Danger!
Bei Nichtbeachtung der Sicherheitshinweise besteht die Gefahr schwerer oder tödlicher Verletzungen durch elektrischen Strom.

Warning!
Possibly a dangerous situation can occur, which results in burns because of hot surfaces or liquids, if not avoided.

U+:	Positive supply connection
U-:	Negative supply connection
SIG+:	Positive bridge signal
SIG-:	Negative bridge signal

2 Transport, Packaging, Storage

2.1 Transport

Check the instument for any damage that may have been caused during transportation. If, report them immediately.

2.2 Packaging

Do not remove packaging until just before mounting. Keep the packaging as it will provide optimum protection during transport (e.g. change in installation site, sending back).

2.3 Storage

For longer term storage avoid the following influences:

- Direct sunlight or proximity to hot objects
- Mechanical vibration, mechanical shock (putting it hard down)
- Soot, vapour, dust and corrosive gases

If possible store the device in ist original package or an equivalent one

3 For your safety

Before installation, commissioning and operation ensure that the appropriate summing amplifier has been selected in terms of measuring range, design, specific measuring conditions and appropriate wetted parts materials (corrosion).

More important safety instructions can be found in the individual chapters.

3.1 Intended use of the product

The strain gauge summing amplifier DSV-6E is used for the summation of 1...6 strain gauge signals. An integrated electronics is checking the connected strain gauge bridges for wrong function.

The summing amplifier has been designed and built solely for the intended use described here and may only be used accordingly.

The technical specifications contained in these operating instructions must be observed. Improper handling or operation of the instrument outside of ist technical specifications requires the instrument to be taken out of service immediately and an inspection by the manufacturer.

When the instrument is transported from a cold into a warm environment, the formation of condensation may result in the instrument malfunctioning. Before putting it back into operation, wait for the instument temperature and the room temperature to equalise.

The manufacturer shall not be liable for claims of any type based on operation contrary to the intended use.

3.2 Personnel qualification

Risk of injury if qualification is insufficient

Improper handling can result in considerable injury and damage to equipment.

- The activities described in these operating instructions may only be carried out by scilled personnel who have the qualifications described below.
- Keep unqualified personnel away from hazardous areas.

For installation and starting of the summing amplifier the personnel has to be familar with the relevant regulations and derectives of the country and must have the qualification required. They must have knowledge on measurement and control technology, have to be acquainted with electric circuits, are capable of carrying out the work described and can indenpendently recognise potential hazards. Depending on the operation conditions of the application they have to have the corresponding knowledge, e.g. of aggressive media.

3.3 Special hazards

For hazardous media such as oxygen, acetylene, flammable or toxic gases or liquids, refrigeration plants, compressors, etc., in addition to all standard regulations, the appropriate existing codes or regulations must also be followed.

If you do not observe the appropriate regulation, serious injuries and/or damage can occur!

A protection from electrostatic discharge (ESD) is required.
The proper use of grounded work surfaces and personal wrist strpas is required when working with exposed circuitry (PCB, printed circuit boards), in order to prevent static discharge from damaging sensitive electronic components.

There is a danger of death caused by electric current.
Upon contact with life parts, there is a direct danger of death.

Electrical instruments may only be installed and connected by scilled electrical personnel.

Operation using a defective power supply unit (e.g. short circuit from the mains voltage to the voltage output) can result in life-threatening volotages at the instrument.

Residual media in dismounted instruments can result in a risk to personnel, the environment and equipment. Take sufficient precautionary measures.

Do not use this instrument in safety or Emergency Stop devices. Incorrect use of the instrument can result in injury.

4 Starting, operation

4.1 Function

The Intelligent 6-fold Strain Gauge Summing Amplifier DSV-6E is a safety-related system which is monitoring strain gauge sensors for their operatability. The strain gauge sensors are checked for sensor break, sensor and mid-point short circuit and sensor resistance drift. By occurrence of a sensor failure the summing-up signal is detuned an can be evaluated with a control and diagnostic unit or a transmitter. Inside the device the position of the faulty sensor is shown with a steady-burning LED. For additional safety a relay point, which is active on error, can be used.

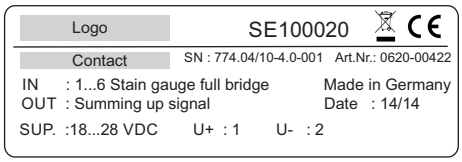
4.2 Before mounting

Check if a completely assembled summing amplifier is supplied.

Inspect the summing amplifier for possible damage during transportation. Should there be any obvious damage, inform the transport company and supplier without delay.

Keep the packaging, as it offers optimal protection during transportation.

4.3 Product label (example)



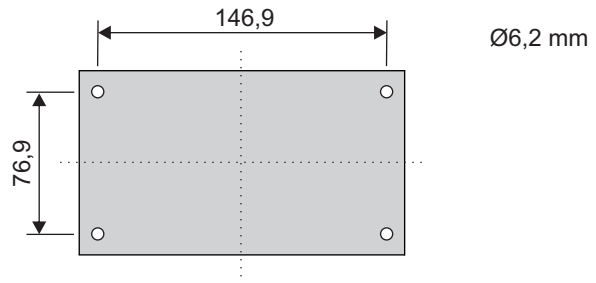
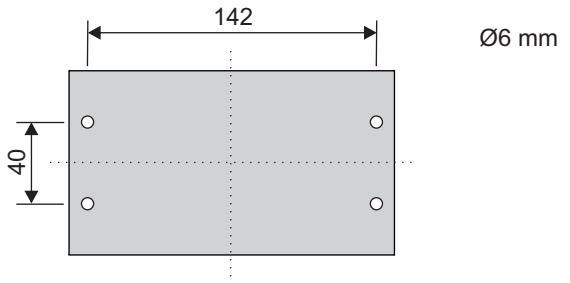
SE...	:	Product code	Art.Nr.	:	Part number
IN	:	Input	SN	:	Serial number
OUT	:	Output	Date	:	Date of QC
U+	:	Supply +	SUP.	:	Supply
U-	:	Supply -			

4.4 Mounting

Warning

Choose a suitable place to mount the strain gauge summing amplifier.

Take care that the mounting place for the enclosure is shaded from direct sunlight. Otherwise it involves the danger of overheating the electronics.

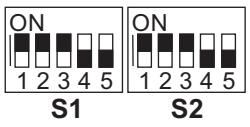
Hole pattern enclosure plastics	Hole pattern enclosure aluminium
	

4.5 Electrical connection

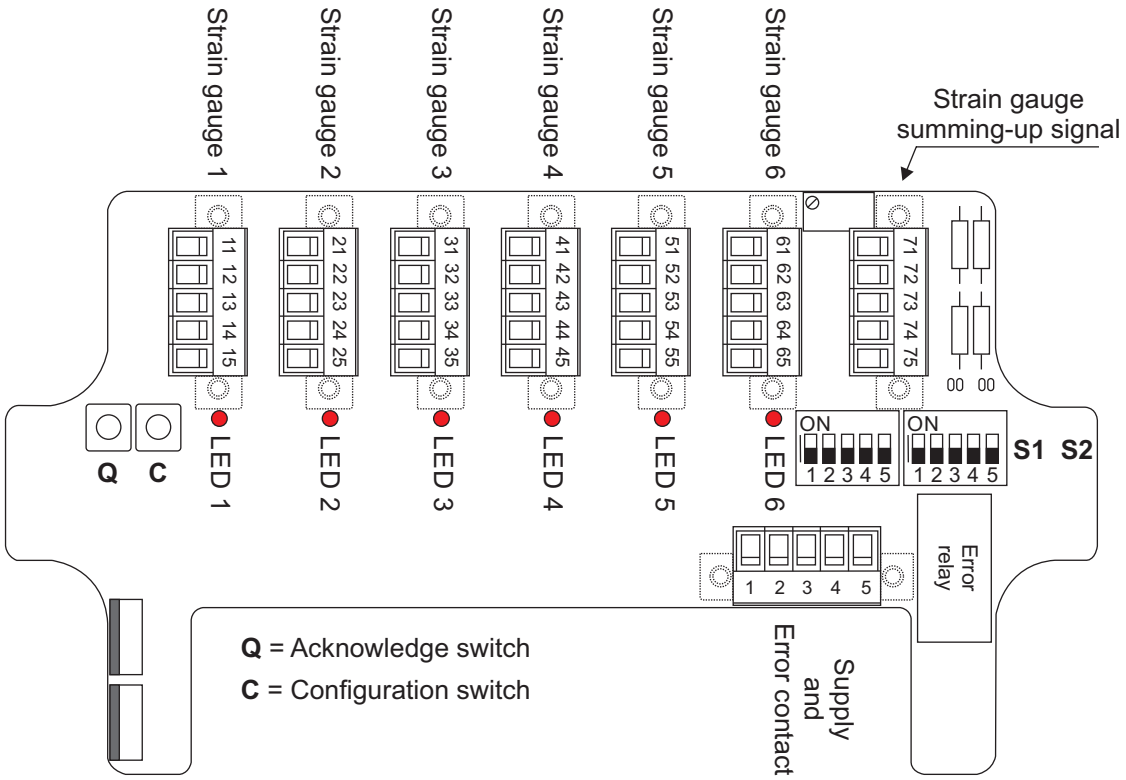
For connection see also page 5 (4.6 and 4.7)

At option 1 to 6 strain gauge sensors can be connected to the strain gauge summing amplifier. As well observe that the connector plugs have to be used in sequence. The first strain gauge sensor has to be connected to slot 1, the second strain gauge sensor to slot 2, the third strain gauge sensor to slot 3, and so on. When disconnecting one of the sensors the resulting gap has to be filled from the neighbouring higher slot number, that means that the higher numbered sensors have to move up.

After the connection of the strain gauge sensors the both 5-pole DIP switches have to be set to the number of available sensors (S1, S2). With factory configuration all switches are set to position „OFF“, with this configuration only strain gauge bridge 1 can be connected. For the connection of more strain gauge bridges both DIP switches have to be set to position „ON“, corresponding to the number of the additional sensors. The example below is showing the setting for the connection of strain gauge sensors from slot 1 to slot 4.



4.5 Overview PCB connection



4.7 Terminals

Strain gauge bridge 1

11	12	13	14	15
SIG+	SIG-	U+	U-	⊥

Strain gauge bridge 2

21	22	23	24	25
SIG+	SIG-	U+	U-	⊥

Strain gauge bridge 3

31	32	33	34	35
SIG+	SIG-	U+	U-	⊥

Strain gauge bridge 4

41	42	43	44	45
SIG+	SIG-	U+	U-	⊥

Strain gauge bridge 5

51	52	53	54	55
SIG+	SIG-	U+	U-	⊥

Strain gauge bridge 6

61	62	63	64	65
SIG+	SIG-	U+	U-	⊥

Strain gauge summing-up signal

71	72	73	74	75
SIG+	SIG-	U+	U-	⊥

Supply / Error contact

1	2	3	4	5
U+	U-	**C**	**NC**	**NO**

4.8 Configuration

Configuration at initial start-up

After the connection of the voltage supply, the strain gauge summing-up signal to a device for evaluation and, where required, the error relay, the strain gauge summing amplifier has to be configurated. When all connections are set up, switch on the voltage supply of the device. The further course of the configuration:

- After powerup LED 2 flashes five times (Load of the up to now stored values)
- Press key „C“ for the initial start-up, LED 1 flashes five times (The device is now in configuration mode)
- Input the number of the connected strain gauge bridges by pressing key „C“ corresponding to the number. The related LED‘s are lighting up.
- By pressing key „Q“ the number of strain gauge bridges is stored.
- The device is now in normal operation. If all connected sensors are in good order, no one of the 6 LED‘s is shining.

Reconfiguration

Course of a reconfiguration (e.g. the number of the connected strain gauge bridges has changed):

- Press key „C“ for a reconfiguration, LED 1 flashes five times (The device is now in configuration mode)
- Input the new number of the connected strain gauge bridges by pressing key „C“ corresponding to the number. The related LED‘s are lighting up.
- By pressing key „Q“ the new number of strain gauge bridges is stored.
- The device is now in normal operation. If all connected sensors are in good order, no one of the 6 LED‘s is shining.

In case of an error

In case of an error the collective error contact switches, the summing-up bridge signal for the subsequent evaluation is detuned and inside of the device the place of the faulty strain gauge bridge is indicated (LED 1 to LED 6. The following procedure can be used:

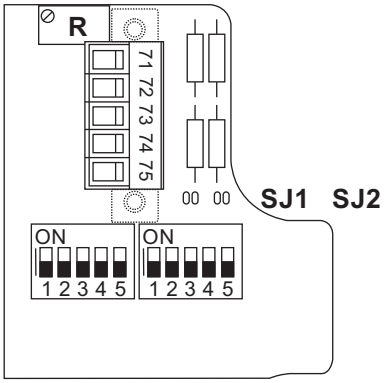
- The LED at the place of the faulty strain gauge bridge is shining permanently
- Now the corresponding strain gauge sensor has to be checked and, when necessary, to be repaired or replaced.
- When the sensor is connected again correctly, key „Q“ has to be pressed. Thereby the error mode is left and the LED goes out.
- If the error is still be there, the LED is shining permanently further on.

Caution

When having a reconfiguration or a change in the number of connected strain gauge sensors, the 2 DIP switches have to be set correctly.

4.9 Adjustment of zero point offset

When after the connection of the strain gauge sensors there is a summing-up output signal without load, this offset can be neutralized with potentiometer R. Proceed as follows:



Solder bridge SJ1: close with offset ??
Solder bridge SJ2: close with offset ??

Connect the summing-up output signal (Terminal 71...75) with the subsequent measuring amplifier.

When the measuring amplifier has no displaykeine, connect a high-resistance millivoltmeter to terminals 71 and 72 ein.

Adjust the offset with potentiometer R.

5 Maintenance, Dismounting, Return, Cleaning, Disposal

5.1 Maintenance

The Intelligent 6-fold Strain Gauge Summing Amplifier DSV-6E require no maintenance and contain no components which could be repaired or replaced.

5.2 Dismounting

Warning

Residual media in dismounted instruments can result in a risk of personnel, the environment and equipment. Take sufficient precautionary measures.

5.3 Return

Warning

When returning the instrument, use the original packaging or a suitable package.

To avoid a damage, use for example antistatic plastic film, shock-absorbent material, a marking as highly sensitive measuring instrument.

5.4 Cleaning

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- Before cleaning the instrument disconnect the electrical connection.
- Clean the instrument with a moist cloth.
- Electrical connections must not come into contact with moisture.

5.5 Disposal

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Dispose instrument components and packaging materials in accordance with the respective waste treatment and disposal regulations of the region or country to which the sensor is supplied

6 Technical data

Input		
Sensor:	1...6 strain gauge full bridge	
Configuration:	via DIP switch, microswitch	
Bridge resistance:	350 Ω	
Bridge supply:	10 VDC	
Bridge connection:	4-wire	
Range input signal:	1...4 mV/V	
Cable towards sensor:	Length:	10 m maximal
	Type:	single shielded (recommended)
Srain gauge monitoring		
Gain:	1	
Monitoring:	sensor break, sensor and mid-point short circuit, sensor resistance drift	
Test signals:	cyclic test pulse	
Error signal internally:	associated LED of the strain gauge lights	
	error collective relay switches (?? VDC ?? A / ?? VAC ?? A)	
Error signal externally:	detuning of the strain gauge summing-up signal	
	Evaluation: with downstream control and diagnostic unit	
Output		
Strain gauge:	Summing-up signal	
Zero point offset:	adjustable via potentimeter	
Supply		
Voltage:	18...28 VDC	
Current consumption:	150 mA maximum	
Ambient conditions		
Operation temperature:	-20...+60°C	
Storage temperature:	-20...+70°C	
Mechanics		
Enclosure aluminium:	Type:	aluCase AC 092 with clip-on design covers
	Dimensions:	160 x 90 x 60 mm
	Material:	die-cast aluminium
	Mounting:	covered screw channels
	Colour:	RAL 9006 (aluminium white)
	Weight:	approx. 850g
Enclosure plastics:	Type:	U-CASE 2
	Dimensions:	162,2 x 92,2 (101,1) x 60,2 mm
	Material:	ASA 757G Luran S
	Mounting:	4 mounting holes
	Colour:	black
	Weight:	approx. 450 g
Degree of protection:	IP 65	
Connection:	plug-in terminal strips, up to 1,5 mm²	
Cable entry:	8 screwed cable glands M16x1,5 (metal)	