Practice. user manual

LVCpro

2-channel press force measuring device

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Systems. Controls. Sensors.

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Table of contents

1 Change index

Change	Date	Index
First edition	13. june 23	00
Change of design	01.02.25	01

2 General

This user manual contains the following subjects:

- Electrical specifications
- Installation
- Commissioning
- Configuration/parameterization

Since the documentation has a modular structure, this user manual is deemed a supplement to other sources of documentation such as product data sheets, dimensional drawings, brochures and assembly instructions.

The user manual may form part of the scope of delivery depending on customer specifications or it may be requested separately.

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*These operating instructions are kept up-to-date. However, since **TRsystems GmbH/UNIDOR** products are subject to continuous further development, it is possible that short-term deviations between the device version and the operating instructions might occur due to technical changes. Please note that we do not assume liability for damage which might arise as a result.*

2.1 Scope of application

This user manual solely applies to the following product:

LVCpro

Order number: 1040 4x02 0000

The products are marked by attached nameplates and form part of a system.

Therefore, the following documentation applies:

- The system-specific operating instructions of the operator
- This user manual
- Further documents supplied together with system

3 Additional safety notes

3.1 Definition of icons and notes

means that minor physical injury or property damage may occur if appropriate precautions are not taken.

refers to important information and/or characteristics of and application advice for the product used.

3.2 Supplement notes to the intended use

The system is designed to be used in **Ethernet** networks with a maximum speed of 100 Mbs for full-duplex operation specified in IEC 61158 as CPF2/2 (Communication Profile)

The technical directives on establishing the Ethernet network must be complied with in order to ensure safe operation.

The intended use also includes:

observing all notes contained in this user manual,

observing the assembly instructions, in particular the chapter ***"Fundamental safety notes"*** *must be read and understood before beginning to work*

3.3 Organizational measures

This user manual must always be available at the place of use of the system.

Before beginning work, the personnel assigned to perform activities on the system must have read and understood

- the assembly instructions, in particular the chapter "Fundamental safety notes",
- and this user manual, in particular the chapter "Additional safety notes"

.

This particularly applies to temporary personnel.

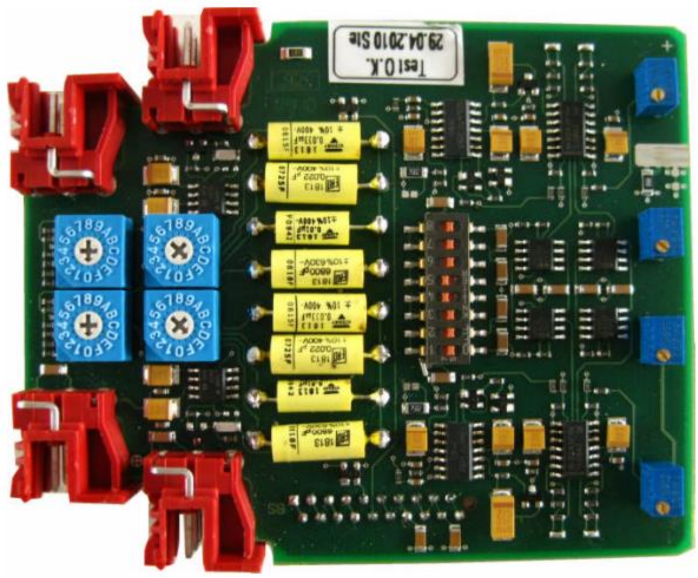
4 Technical data

Supply input voltage:	10-32VDC / 24VDC nom.
Input current:	90mA
Amplifier input resistance:	10^{15} Ω/ohm
Output resistance:	50 Ω/ Ohm
Measuring window:	input / cam
Input voltage:	18-32VDC
Input current:	approx. 10mA at 24VDC
Function:	active high = 1, output low = 0 deletes analog signal
Output data Output voltage:	-10V to +10V
Output channels:	2
Dimensions (WxHxD) incl. plug:	35 x 110 x 112mm
Weight approx.:	300g

5 Introduction

The LVCpro is suitable for dynamic and quasi-static measurement processes. With the compact LVCpro 02 charge amplifier cassette, multi-channel measurement of the press force can be carried out cost-effectively using piezo sensors. Evaluation can be carried out via any higher-level control system with analog input, e.g. Unidor systems or external PC and PLC systems.

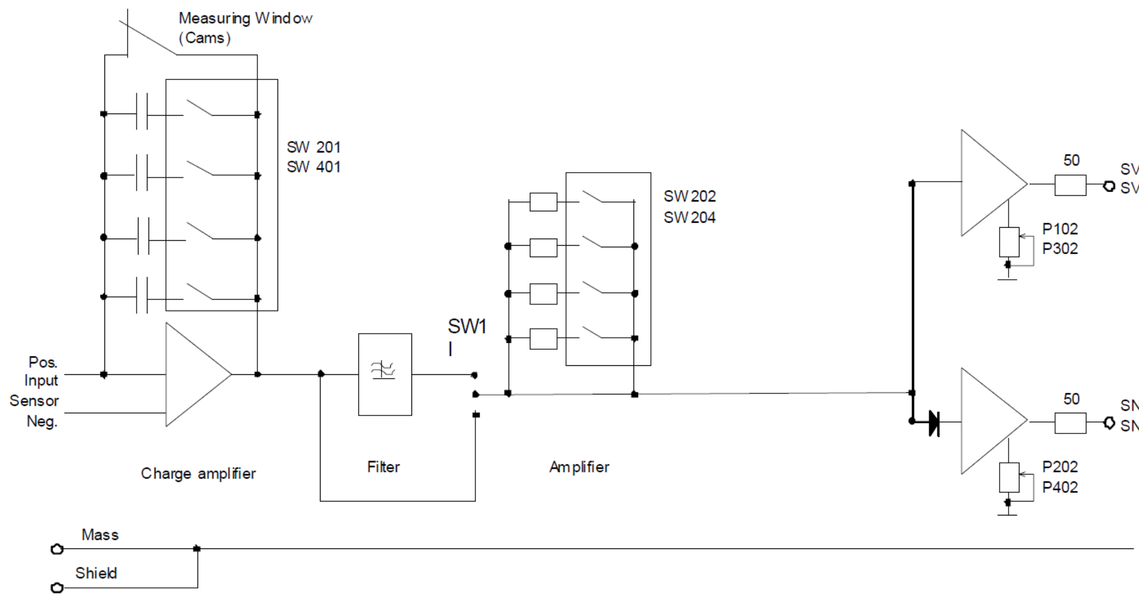
6 View of LVCpro



Advantages

- Easy installation and wiring
- 24VDC supply voltage
- 2 measuring channels
- Peak value memory and instantaneous value are available simultaneously
- Switchable filter to suppress interferences

7 Block diagram



8 Pin assignments

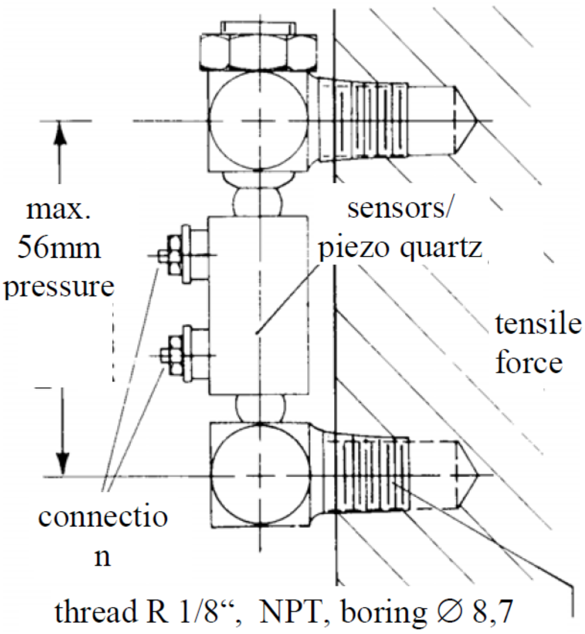
Connector top:	PIN:	Assignment:
Power	24V	24V DC
	0V	0V DC
	NC	not used
CAM 1+2	C1	Cam 1 Channel 1
	C2	Cam 2 Channel 2
	0	0V DC
Piezo Sensor 2	IN2	Signal Sensor 2
	GND	Analog ground
	CASE	Shield
Piezo Sensor 1	IN2	Signal Sensor 1
	GND	Analog ground
	CASE	Shield
Connector bottom:	**PIN:**	**Assignment:**
PeakOut 1	OUT 1	Peak value 1
	GND	Analog ground
	Case	Shield
PeakOut 2	OUT 2	Peak value 2
	GND	Analog ground
	Case	Shield
AnalogOut 1	OUT 1	-10V/+10V Output 1
	GND	Analog ground
	Case	Shield
AnalogOut 2	OUT 2	-10V/+10V Output 2
	GND	Analog ground
	Case	Shield

8.1 Connector codes

1x	1x	2x	4x
			
Power	CAM 1+2	PiezoSensor 1 PiezoSensor 2	PeakOut 1 + 2 AnalogOut1 + 2

9 Piezo Sensor connection

The piezo sensors delivered with the device are mounted to the press either on the pressing or drawing side (see diagram below). In order to protect the sensors, please place the protective caps over the sensors once the latter have been mounted and calibrated. The cables that connect the sensors to the device should not be disconnected or extended with either connectors or terminals (charge loss).



Assignment sensor JZT 127

Press	**pull**
channel 1+	**channel 1 -**
black red	red black
Channel 2+	**Channel 2 -**
black red	red black

9.1 Sensor JZT 127/S cable black (stand mounting)

Pin assignment for pressure load

Sensors	Connector LVCpro	Wire color	PIN
Press force sensor 1	PiezoSensor 1	black red Shield	IN1 GND CASE
Press force sensor 2	PiezoSensor 2	black red Shield	IN2 GND CASE

Pin assignment for tensile load

Sensors	Connector LVCpro	Wire color	PIN
Press force sensor 1	PiezoSensor 1	red black Shield	IN1 GND CASE
Press force sensor 2	PiezoSensor 2	red black Shield	IN2 GND CASE

Sensor JZT 127/S Cable white (connecting rod assembly)

Pin assignment for pressure load

Sensors	Connector LVCpro	Wire color	PIN
Press force sensor 1	PiezoSensor 1	black white Shield	IN1 GND CASE
Press force sensor 2	PiezoSensor 2	black white Shield	IN2 GND CASE

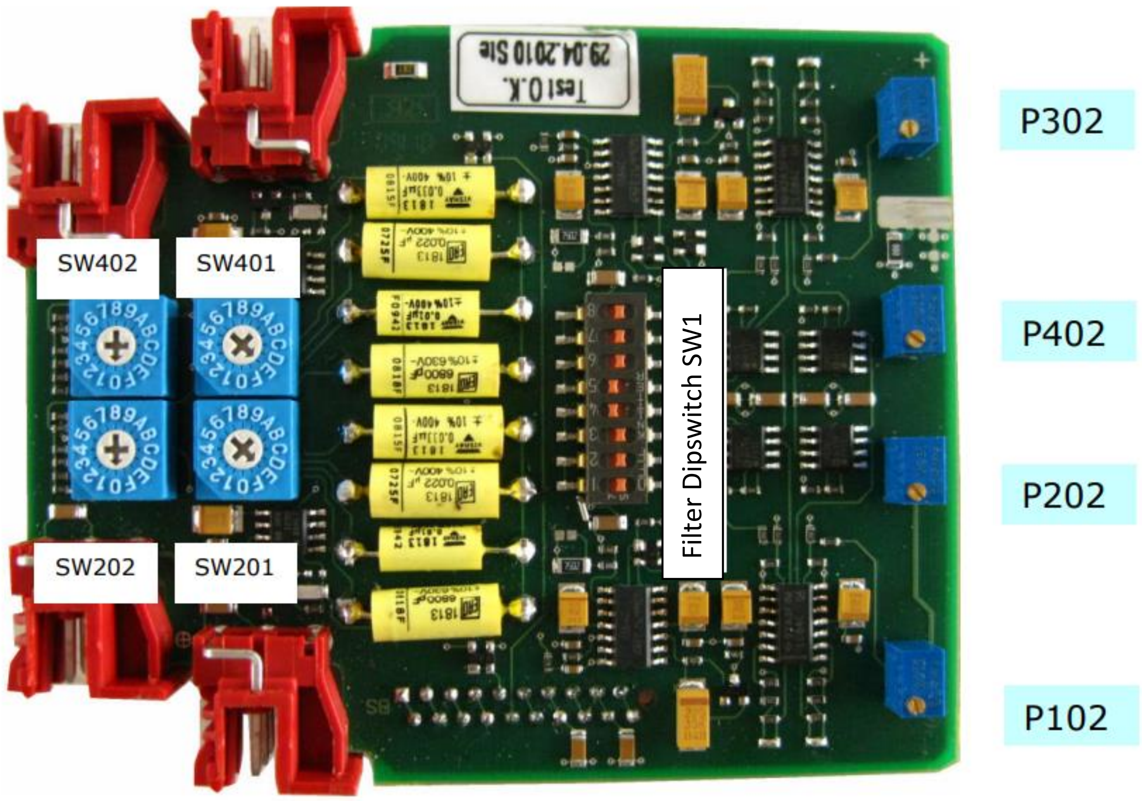
Pin assignment for tensile load

Sensors	Connector LVCpro	Wire color	PIN
Press force sensor 1	PiezoSensor 1	white black Shield	IN1 GND CASE
Press force sensor 2	PiezoSensor 2	white black Shield	IN2 GND CASE

10 Setting of the code switches

The analog inputs and outputs are adjusted using the hexadecimal code and DIP switches. The settings are made separately for each channel.

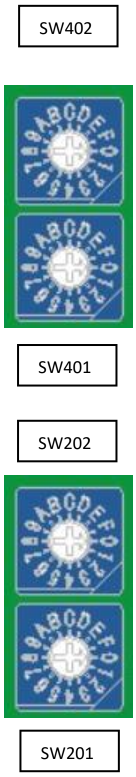
Channel /Sensor	Codeswitches	Function
Channel 1+2	SW 1	Filter settings
Channel 1 Piezosensor 1	SW 201 SW 202 P 102 P 202	Capacitive rough amplification Gain adjustment (fine) Offset ANA OUT 1 Offset PEAK OUT 1
Channel 2 Piezosensor 2	SW 401 SW 402 P 302 P 402	Capacitive rough amplification Gain adjustment (fine) Offset ANA OUT 2 Offset PEAK OUT 2



10.1 Setting of the code switches

Codeswitches SW201(401) capacity (nF)

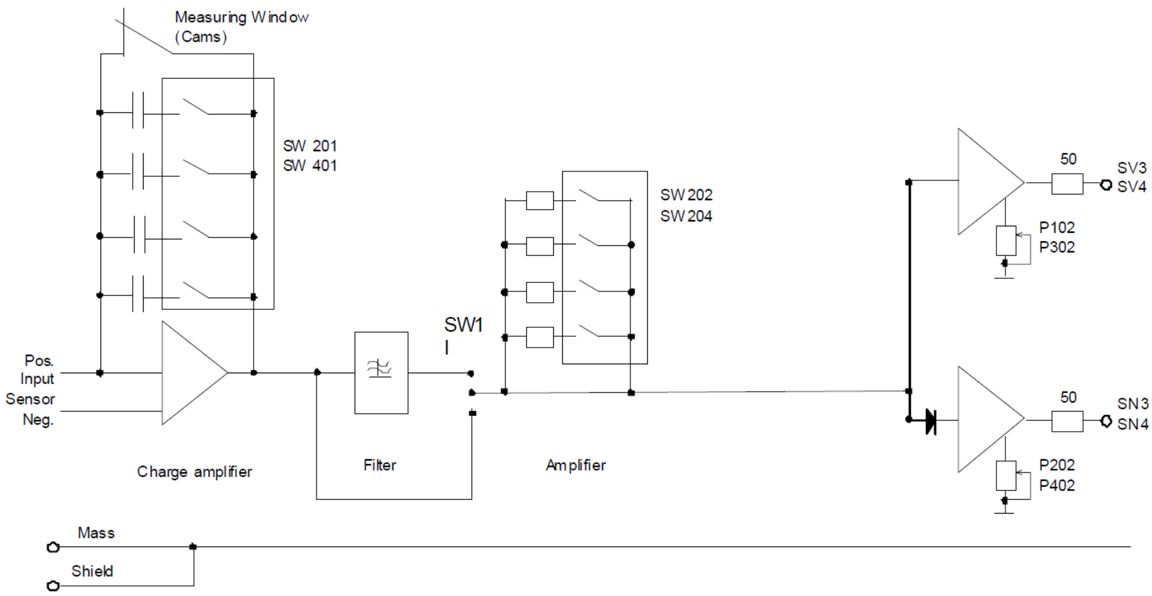
0	71,8
1	65,0
2	61,8
3	55,0
4	49,8
5	43,0
6	39,8
7	33,0
8	38,8
9	32,0
A	28,8
B	22,0
C	16,8
D	10,0
E	6,8
F*	0,0



Codeswitches SW202(402) amplification

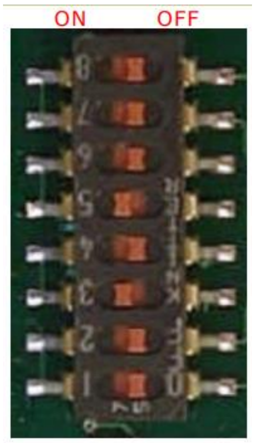
0	11,12
1	11,08
2	11,03
3	10,96
4	10,93
5	10,84
6	10,76
7	10,64
8	10,48
9	10,27
A	10,07
B	9,67
C	9,51
D	8,80
E	7,90
F	5,27

***setting not permitted**



10.2 DIP switches or filter settings SW1

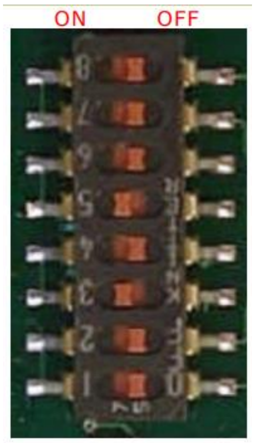
Channel 1 / Piezosensor 1



(default)
Factory setting
with filter, F border =
1KHz

DIP Switch	Function	
1+2	Either only switch 1 or switch 2, or switch neither of them on! F border= 1kHz (33nF) (default 1+2= OFF)	
1	F border= 100Hz (220nF II 33nF) (1=ON, 2=OFF)	
2	F border= 355Hz (47nF II 33nF) (2=ON, 1=OFF)	
	Attention: Only switch 3 or switch 4 to ON, never both at the same time, otherwise otherwise this can lead to malfunctions or damage to the electronics.	
3	with Filter (default 3=ON, 4=OFF)	
4	without Filter (4=ON, 3=OFF)	

Channel 2 / Piezosensor 2



(default)
Factory setting
with filter, F border =
1KHz

DIP Switch	Function	
	Attention: Only switch 5 or switch 6 to ON, never both at the same time, otherwise this can lead to malfunctions or damage to the electronics.	
5	with Filter (default 5=ON, 6=OFF)	
6	Without Filter (6=ON, 5=OFF)	
7+8	Either only switch 7 or switch 8, or switch neither of them on! F border= 1KHz (33nF) (default 7+8= OFF)	
7	F border= 100Hz (220nF II 33nF) (7=ON,8=OFF)	
8	F border= 355Hz (47nF II 33nF) (8=ON,7=OFF)	

11 Commissioning the LVCpro

- Wiring the piezo sensors. Wire the measuring window and outputs according to the PIN assignment. Apply supply voltage (ensure correct polarity!)

- Adjustment (calibration) of the amplifiers with the piezo sensors used according to the table in section 6.

- The code switches SW201 (channel 1) and SW401 (channel 2) can be used to compensate for different sensor sensitivities compared to the basic setting in the case of multi-channel measurement.

- Set the amplification factor to basic position 3 according to section 9 using the respective code switches SW202 (channel 1) or SW402 (channel 2).

- Set the maximum power of the measurement object (e.g. maximum pressing force). Switch the code switch SW201 (channel 1) or SW401 (channel 2) up continuously until the desired output voltage is reached at the analog output (max. 10V). We recommend an end position of 7V output voltage at maximum load so that evaluation is still possible in the event of an overload.

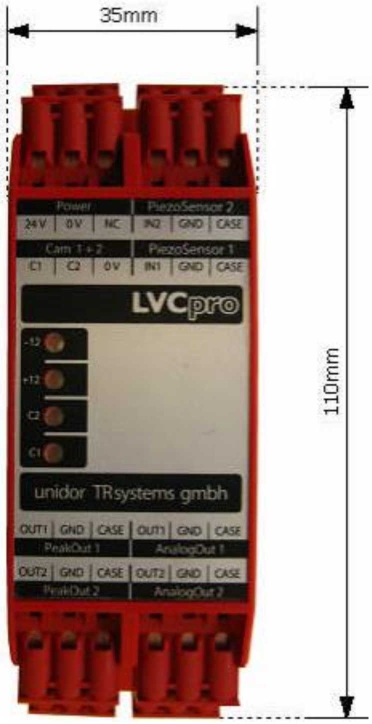
- When replacing the LVCpro charge amplifier cassette, ensure that all code switches have the same setting, otherwise there is a risk of overload (falsification of the measurement result)!

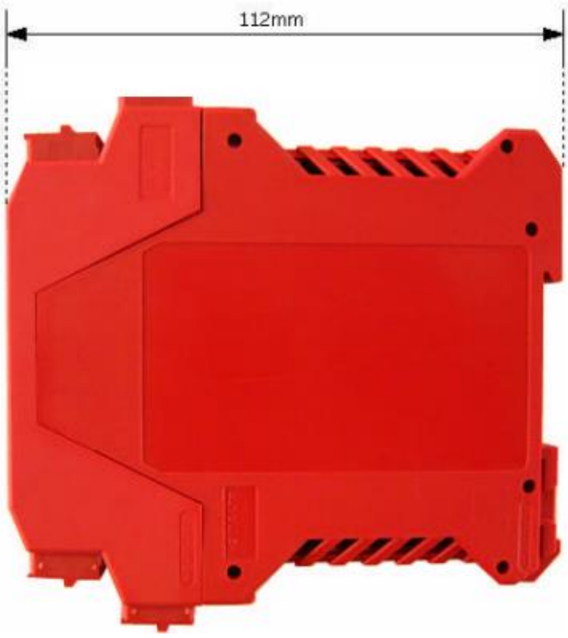
12 Ordering data LVCpro

Item description	Type	Order no:
Charge amplifier cassette 2-channel Charge amplifier cassette 2-channel (lower gain / sensitivity)	LVCpro 02-S LVCpro 02-SG	10 40 4302 0000 10 40 4402 0000
Charge amplifier cassette 2-channel with cam input Charge amplifier cassette 2-channel with cam input (lower gain / sensitivity)	LVCpro 02 LVCpro 02-G	10 40 4102 0000 10 40 4202 0000
Press force sensor sheath black (stand mounting) with 6m* connection cable	JZT 127 / S	50 01 01 01 0000
Press force sensor sheath white (connecting rod mounting) with 6m*connecting cable	JZT 127 / P	50 01 01 06 0000
Coaxial cable, open end on both sides (sold by meter)	MIL-C-17F-RG 058 CU	64200120

* Other cable lengths are available on request

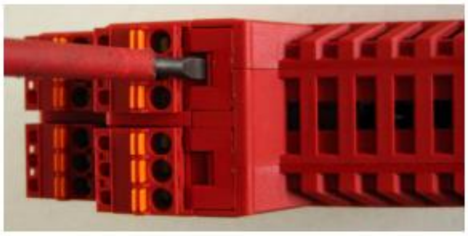
13 Mechanical dimensions LVCpro





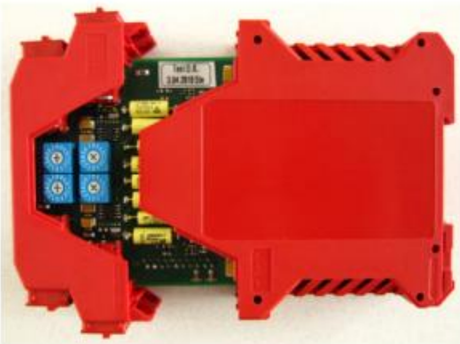
14 Opening the LVCpro

1. Use a screwdriver to press on the split pin in the opening tab, which is located below the Power and PiezoSensor2 connectors and below PeakOut2 and AnalogOut2.



2. Push the split pin pressed with the screwdriver backwards over the latched locking tab...

3. ...and press backwards at the same time. Now you can remove the housing cover by repeating this step with all 4 fasteners.



4. the LVCpro can now be opened and the code switches for setting or calibrating the pressing force are exposed

15 EC Declaration of Conformity

Manufacturer: TRsystems GmbH, System department Unidor

Factory: Unidor, Freiburger Straße 3, D-75179 Pforzheim

hereby confirm for the

Product: LVCpro

Device type: Charge amplifier

Model name: LVCpro 02, LVCpro 02-G, LVCpro 02-S, LVCpro 02-SG

compliance with the EC Directive 89/392/EEC and the following standards:

- ✓ EN 60204.1, Electrical Equipment for Industrial Machines
- ✓ Electromagnetic Compatibility 89/336/EEC IEC 801 Parts 1, 2, 4
- ✓ EN 55011 Radio Interference Voltage
- ✓ EN 55022 Noise Radiation
- ✓ VDE 0100, VDE 0113, EN 60204

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