

CoMo II

Type 5857B...

Control Monitor

CoMo II Type 5857B... is a universal measuring, display and analysis unit. It can simultaneously record two measurands and display them either as a function of time or in their mutual dependence.

- Flexible monitoring of joining, press-in and testing processes
- Direct connection of different sensor systems
- Type of measurement $y(x)$ or $y_1(t)$ and $y_2(t)$ or $y_1(t_1)$ and $y_2(t_2)$
- Display of the recorded signal trace on the graphic display, additional display of numerical values
- Process monitoring with various analytical functions: thresholds, boxes, end position, tolerance band
- Graphical adjustment of the analytical functions directly on the display
- Simple integration into the process automation (digital I/O, Profibus DP, RS-232C)
- 16 various settings can be stored
- CE conformity



Description

Many of the common types of sensor used today can be connected directly to the unit. This means that CoMo II can be used to control and monitor any production process. Freely definable analytical functions (thresholds, boxes, limit position, tolerance band, minimum/maximum values and statistical values) enable production processes to be monitored and evaluated at particularly critical points or over the entire operation. Up to 16 different monitoring programs can be saved directly in the unit.

The 8 digital inputs and outputs in each case, the serial interface or Profibus DP can be used for integrating the CoMo II into the process control system (e.g. SPC). Operation is by menu control via the keyboard. Indications are provided by an illuminated graphic display (LCD).

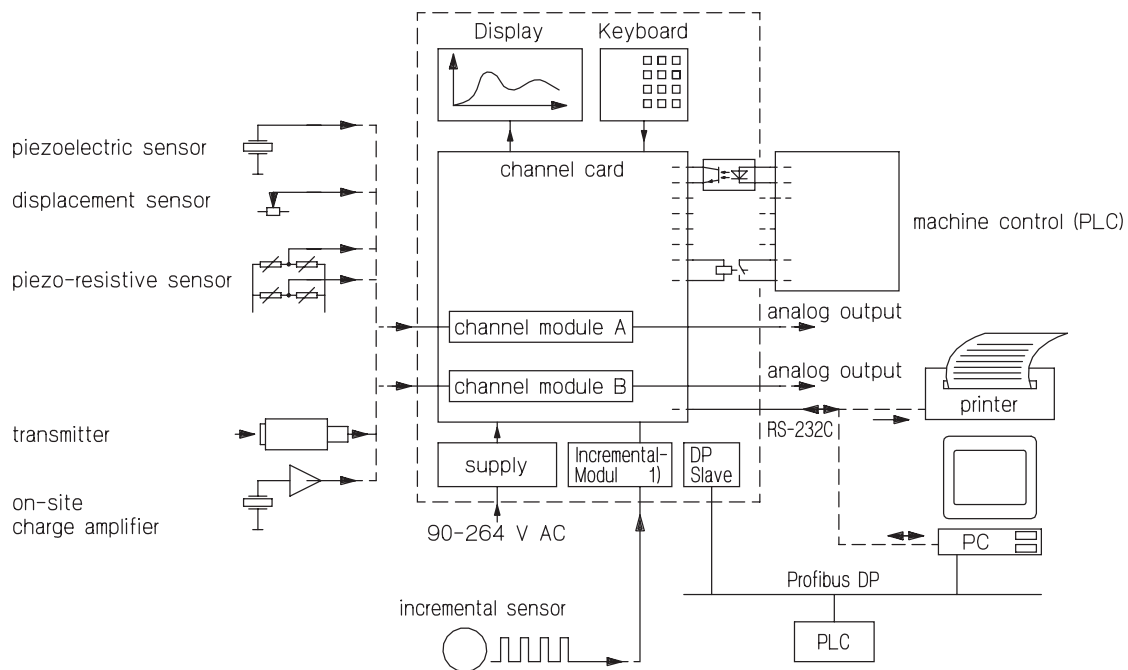
The unit meets the safety requirements of EN 61010-1 and the EMC regulations EN 50081-1 (interference emission) and EN 50082-2 (interference immunity). Inputs and outputs are protected against electrostatic discharges by varistors.

Construction

CoMo II has a modular construction and can be assembled according to the application required. The unit is designed with the following basic components which are within the dashed lines in the block diagram next page.

- Channel card with integrated RS-232C interface and two expansion slots for one channel module each
- 1 or 2 channel modules (type according to type of sensor) with analog monitor output
- Case (Desktop case or 19" cassette also with panel mounting set)
- Switched-mode power supply allows supply connections of 90 ... 264 V AC
- Front panel with graphical display and keyboard

000-443e-03.03 (DB10.5857Be)



1) Remark: for type 5857B_3 only

Fig. 1: Block schematic diagram of CoMo II

Channel Modules

In addition to the charge signals from piezoelectric sensors, CoMo II can also process the signals from many other sensor systems. The various types of channel modules are provided with appropriate adapters for this purpose.

Currently available modules include modules for charge, voltage or current signals for the connection of incremental encoders, as well as for «Range» and «Operate» control of external measuring amplifiers.

The analog amplifier output signal or the processed CoMo II signal can be taken from separate outputs for monitoring functions.

Charge Amplifier Module Type 5061A

Single-channel charge amplifier for the connection of quartz-based piezoelectric sensors.

Selectable measuring ranges of
 ± 10 , ± 30 , ± 100 , ..., $\pm 1\,000\,000$ pC.

Charge input BNC negative.

Various options are available (time constant, input low-pass filter).

Voltage/Current Module Type 5263A

Universal measuring amplifier for DC voltages up to ± 10 V and currents up to 20 mA. This module additionally contains a 10 V power source and, for certain types of sensor, a 4 mA power source. In addition, there is an unregulated 24 V DC power source and two «open collector» outputs to connect an external measuring amplifier. Sensor connection is via a 12-pole round plug.

Piezotron Amplifier Module Type 5263A1

Module for piezoelectric sensors with integral impedance converter and a constant-current power supply (Piezotron system). Measuring ranges ± 1 ... ± 10 V. Supply current 4,3 mA. Sensor connection is via a 12-pole round connector.

Incremental Module Type 5265

Module for optional connection of an incremental longitudinal or angular encoder or rotary transducer.

It supports sensors with an analog or digital output and with or without a reference mark. No alignment or jumper positioning is necessary. A Heidenhain-compatible connecting cable is available (see figure 7).

Profibus DP Module

CoMo II can be equipped with the Profibus DP module. The following functions can be controlled:

- Set/read date and time
- Switch/delete/copy parameter set
- Query readiness to measure/measurement status
- Start/Stop measurement cycle
- Reset Alarm
- Read process evaluation
- Fetch numeric values (maximum 6 measuring results, which can be superimposed in the display)

The serial interface cannot be used simultaneously in the Profibus mode. The interface continue to be available for data protection.

Analytical Functions

A microprocessor processes the digitized sensor signals and feeds them to the graphical display. The process can be monitored with various combined analytical functions, such as tolerance band, boxes, end position or thresholds. Control signals are triggered according to the analytical function selected (conforming/nonconforming, collective signal etc.) and sent to the interfaces (digital outputs, RS-232C).

Thresholds

Real time thresholds can be used to actuate trigger signals or, for example, to monitor safety criteria (e.g. overload protection). Other thresholds are used to monitor various partial areas of the signal pattern. Evaluation takes place after the measurement cycle.

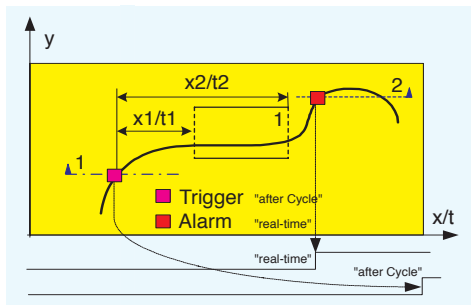


Fig. 2: Threshold values for actuating triggers

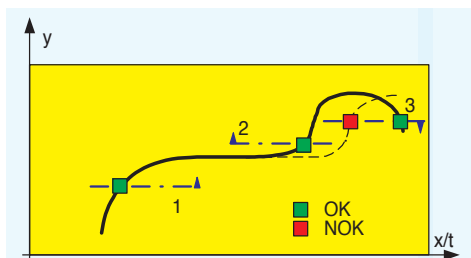


Fig. 3: Threshold values for monitoring partial ranges

Tolerance Band

A tolerance band is placed around the «taught» reference curve. Its width is obtained from the natural dispersion of the process multiplied by a selectable factor, or from a fixed amount. If required, the taught reference curve can be varied according to the process (trend monitoring). The signal trace is monitored to determine if it is within the tolerance band.

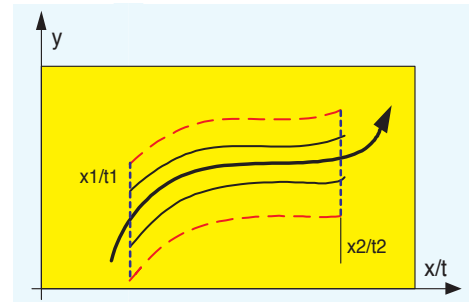


Fig. 4: Reference curve with tolerance band

Boxes

The box function monitors whether the signal trace enters and leaves the specified side of the box. The other sides must not be touched.

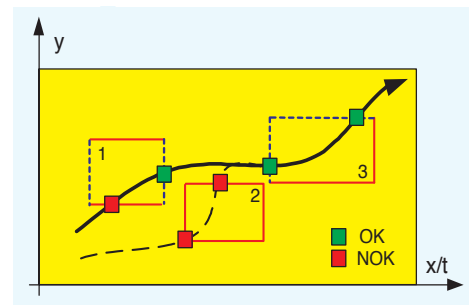


Fig. 5: Monitoring with box function

End Position

The end position of a process is checked by monitoring the end of the process with a box. In the case of a machine press operation, for example, this can be the greatest press depth.

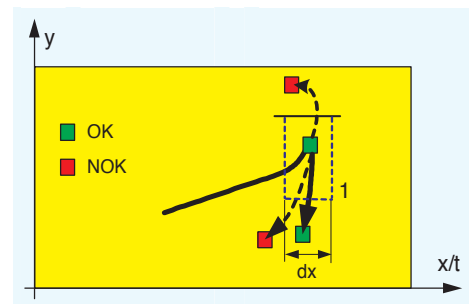


Fig. 6: Checking the limit position of a process

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Technical Data

Basic Unit

Analog channel inputs		2
Sampling frequency		
y/t : y/x	kHz	5,5
y ₁ , y ₂ /t oder y ₁ /t ₁ , y ₂ /t ₂	kHz/channel	2,75
A/D converter resolution	Bit	12
Number of measuring points (per cycle)		512
Antialiasing filter (selectable)		
8th level, Bessel	kHz	0,65 / 1,30
Errors		
with calibration	%	<1
repeat errors	%FS	<0,1
Voltage between measuring and protective ground	V _{rms}	<20
Analog monitor outputs (2 mm-sockets)		2
Output voltage range	V	±10
Error	%	<2
Repeat errors	%FS	<0,1
Digital inputs (electrically isolated via optocouplers)		8
Logical input level, high	V	14 ... 30
Logical input level, low	V	<8
Input current at 24 V	mA	5
Voltage between the inputs and protective ground	V _{rms}	<30
Digital outputs (photo MOS relay, electrically isolated, every 4 outputs unilaterally connected)		8
Voltage	V	<±42
Current load	mA	<100
Current load (pulse <0,1s)	mA	<300
Resistance (operational)	Ω	<50
Voltage between the outputs and protective ground	V _{rms}	<30
Auxiliary supply for external measuring amplifier (Aux. GND/Aux. +24 V, unregulated, electrically isolated)		
Voltage for nominal power line voltage and 150 mA load	V	24
Current load both outputs together	mA	<300
Voltage between aux. GND and protective ground	V _{rms}	<20

Analytical functions	during cycle	after cycle
Thresholds	2	4
Boxes	–	4
End position	–	1
Tolerance band	–	2
Min., max., statistical values	–	6

RS-232C interface

(without control cables, electrically separated)

Voltage at receiver input	V	<±20
Voltage between signal and protective ground	V _{rms}	<30
Baud rates		110, 150, 300, 600, 1200, 2400, 4800, 9600, 19 200, 38 400
Data bits		7 or 8
Stop bit		1
Parity		no, even, odd

General

Operating temperature range	°C	0 ... 40
Supply connection 2P + E (protective class I)		
Plug type		IEC 320C14
Voltage	VAC	90 ... 264
Frequency / output	Hz (VA)	48 ... 62 (25)
Dimensions		
Rack-mounted, unit according to DIN 41494, Part 5		42TE x 3HE
Desk-top case (WxHxD)	mm	236x151x255
Weight (incl. case)	kg	5,2
Degree of protection according to EN 60529	IP	40

Charge amplifier module Type 5061A

Measuring range, selectable in steps 10, 30, 100,	pC	±10 ... 1 000 000
Drift (Operate)	pC/s	<±0,03
Interference signal due to cable capacitance (at the input)	pCrms/pF	2•10 ⁻⁵
Insulation resistance at the input		
Ranges ≤10 000pC	Ω	>10 ¹⁴
Ranges ≥30 000pC	Ω	>10 ¹²
Input voltage, permissible	V	<±50
Error (without calibration, on exchange)	%	<3,5

Voltage/current module Type 5263A

Voltage input		
Measuring range (selected with jumper)	V	0...10, 0...-10, ±1, ±5, ±10
Input voltage, permissible	V	<±15
Common mode rejection DC ... 50Hz, at differential input	dB	>75
Current input		
Measuring range (selected with jumper)	mA	0 ... 20, 4 ... 20
Input voltage, permissible	V	<±10
Input resistance (load)	Ω	50
Voltage source for sensor supply		
Voltage	V (%)	10 (±0,15)
Current (internal resistance)	mA (Ω)	<20 (≈0,6)
Current source for sensor supply		
Load resistance	kΩ	<5,2
Digital outputs (open collector) for operating an ext. measuring amplifier		
		2
Voltage	V	<50
Load current	mA	<300

Piezotron amplifier module Type 5263A1

Measuring range (selected with jumper)	V	±1, ±5, ±10
Input voltage, permissible	V	-15 ... 30
Supply current for Piezotron sensor	mA (%)	4,3 (±10)
Lower cut-off frequency		
-3dB	Hz	0,03
-1%	Hz	0,3

Incremental module Type 5265**Analog sensor input (differential) up to 30 m cable length**

Range		
Signal A,B	μApp	6 ... 16
Signal Z	μApp	2 ... 8
Frequency		
for interpolation factor (IF) internal		
(IF) = 5,10	kHz	500
(IF) = 20,25,40,50,100,200	kHz	100

Linear sensor

Scale division (TP) according to sensor technical data	μm	1 ... 9999
Max. resolution A (A=TP/IF)		
[where TP=10μm and IF=200]	μm	0,05
Displacement (A•60 000)		
bipolar	mm	±1,5
unipolar	mm	0 ... 3

Min. resolution (A=TP/IF)		
[where TP=10μm and IF=5]	μm	2
Displacement (A•60 000)		
bipolar	mm	±60
unipolar	mm	0 ... 120

Rotary transducer

no. of pulses/rev. (IS) according to sensor technical data		1 ... 30 000
Max. resolution A (A=360°/IS•TF)		
[where IS=360 and TF=200]		0,005°
Displacement (A•60 000)		
bipolar		±150°
unipolar		0...300°
Min. resolution A (A=360°/IS•TF)		
[where IS=360 and TF=5]		0,2°
Displacement (A•60 000)		
bipolar	mm	±6 000°
unipolar	mm	0 ... 12 000°

Sensor input digital (differential, RS-422)

Frequency	MHz	5
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Linear sensor

Scale division (TP) according to sensor technical data	μm	1 ... 9999
Max. resolution A (A=TP/IF•scale division)		
[where TP=10μm, IF=1 without external interpolation and TF=4]	μm	2,5
Displacement (A•60 000)		
bipolar	mm	±75
unipolar	mm	0 ... 150
Min. resolution (A=TP/IF•scale division)		
[where TP=10μm, IF=1 without external interpolation and TF=1]	μm	10
Displacement (A•60 000)		
bipolar	mm	±300
unipolar	mm	0 ... 600

Rotary transducer

No. of pulses/rev. (IS) according to sensor technical data		1 ... 30 000
Max. resolution A (A=360°/IS•IF•TF)		
[where IS=360 and IF=1 without external interpolation and TF=4]		0,25°
Displacement angle (A•60 000)		
bipolar		±7500°
unipolar		0 ... 15 000°
Min. resolution A (A=360°/IS•IF•TF)		
[where IS=360 and IF=1 without external interpolation and TF=1]		1°
Displacement (A•60 000)		
bipolar	mm	±30 000°
unipolar	mm	0 ... 60 000°

General data

Sensor supply		
Supply voltage	V (%)	5 (±5)
Supply current	mA	200
Bit resolution		
	Bit	16 (60 000)
Temperature range		
For specifications	°C	0 ... 70
Storage	°C	-20 ... +85
Connections		
Sensor (analog and digital)	-	DSUB-15
Dimensions		
Circuit board	mm	100x160
Front panel (width/height)	TE/HE	4/3
Weight	g	≈115

The basic unit consists of:

- 19" rack-mounted unit with 42TE/3HE according to DIN 41494
- Channel card with 2 vacant channel module expansion slots
- Power pack
- RS-232C interface
- Menu language selectable between German/English/French

Accessories Included

	Type
• Test cable, black, for 2 mm sockets, monitor output	5.590.096
• Test cable, red, for 2 mm sockets, monitor output	5.590.097
• Cable plug DSUB-26S "high density" for digital inputs/outputs	7.640.052
• Cable plug 12-pole for U/I or Piezotron module	5.510.207
• Cable plug 4-pole for auxiliary supply AUX. +24V	5.510.228
• CD-ROM Windows PC software for data protection	7.643.013
• GSD file and example program for Simatic S7 for PROFIBUS module	

Profibus DP module

Field bus Type PROFIBUS-DP EN50170	
Auto baud rate detection	baud 9,6 kbit ... 12 Mbit

Optional Accessories

	Type
• Potentiometric displacement sensor TR-25 (25mm) with Binder plug, 12 pole	2101A2
• Extension cable to displacement sensor, length as ordered	Z17428sp
• Connecting cable with DSUB-26S plug "high density", 5 m, other end without integral connector	1471A5
• Connecting cable with DSUB-26S plug "high density", and Binder plug, 4-pole, to supply the I/Os, 5 m, other end without integral connector	1473A5
• Connecting cable for incremental displacement unit L=1m, compatible with Heidenhain-type MT...	
Length = 1m	1481A1
Length = 2m	1481A2
(Details see Figure 7 & 8)	
• PC-link cable RS-232C, 5 m long, DB-9P/DB-9S	1200A27
• PC link cable RS-232C, 3m, DB-25P/DB-9S	1465A3
• Printer cable RS-232C, 3m, DB-25P/DB-25P	1467A3
• Cable adapter DB-9P with fastening screw / DB-25S with fastening nut	1479
• Intermediate adapter with test sockets for U/I module, 12-pole	Z16125
• Intermediate adapter with test sockets for digital inputs/outputs, 26-pole	Z16126
• CoMo simulator, incl. cable	Z15822
• Mounting key for 12-pole Binder plug for the U/I module	1300A59
• Spare key for unit operation	5.331.044

Ordering code

CoMo II consists of a basic unit and various modular components with their own type numbers. For an order, there are basically two variations:

1. Popular combinations have their own Type designation which defines them clearly, e.g. Types 5857B11 and 5857B12 (see order example 1).
2. If the CoMo II wanted corresponds to none of the combinations listed, the additional designation at the second place will have a «9» (5857Bx9). When ordering, the additional assemblies must be defined with their own type numbers according to «Ordering key for modular assemblies». See ordering example 2.

Ordering example 1

CoMo II with keyboard and graphic display, with charge amplifier module Type 5061A for channel A and U/I module for channel B, dummy plate, built into desktop case.

Ordering key: Type 5857B11

Ordering example 2

CoMo II with keyboard and graphical display, with 2 charge amplifier modules for channels A and B, 230V power supply, integrated in desktop case, without further options.

Order items

- | | |
|---------------------------------|--------------|
| 1) One basic unit | Type 5857B19 |
| 2) Two charge amplifier modules | Type 5061A |
| 3) One dummy plate | Type 5700A05 |

Ordering key for the base unit Control Monitor CoMo II with keyboard and graphic display

Type 5857B

Case	
19" 42TE cassette	0
Desktop case	1
19" cassette for panel mounting with mounting set	2

Expansion	
Channel card with two vacant channel module expansion slots	0
Channel card with charge amplifier Type 5061A in channel A, U/I module in channel B, dummy plate 5700A5	1
Channel card with charge amplifier module Type 5061A in channel A, cover plate 5700A07 for channel B, dummy plate 5700A05	2
Channel card with charge amplifier module Type 5061A in channel A, cover plate 5700A07 for channel B, with incremental module Type 5265 for channel B on option expansion slot	3
Channel card and modules integrated and configured as specified in the order (expansion defined in individual cases by «Order code for modular components»)	9



Ordering code for modular components

Channel modules for channels A and B	Type
Charge amplifier module	5061A
Voltage/current, piezoresistive module	5263A
Piezotron amplifier module	5263A1
Cover plate for unrequired channels	5700A07

Options	
Dummy plate 4 TE • 3 HE, instead of incremental module	5700A05
Profibus DP module	...Y0459

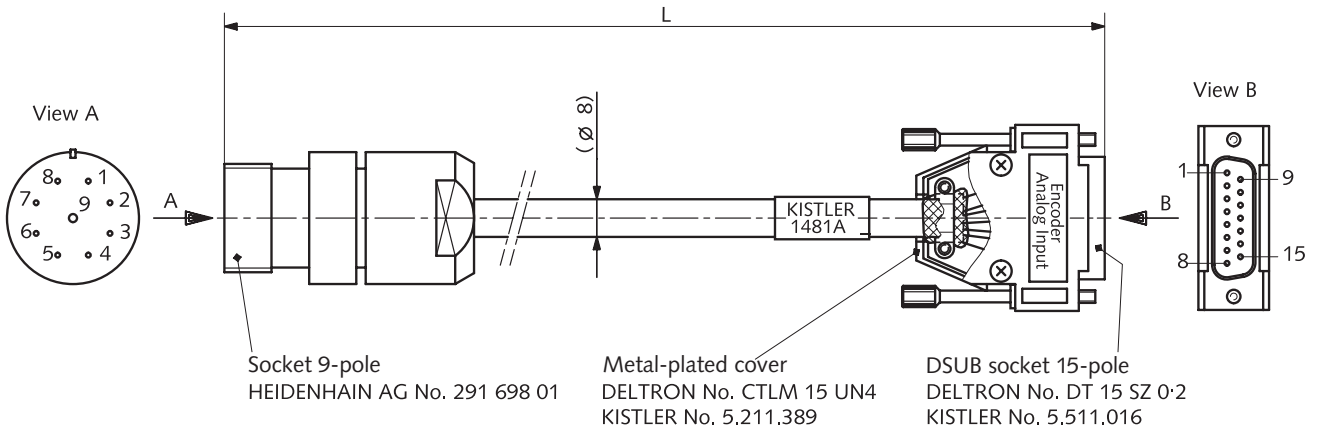


Fig. 7: Connecting cable Type 1481A... for incremental position encoder (Heidenhain)

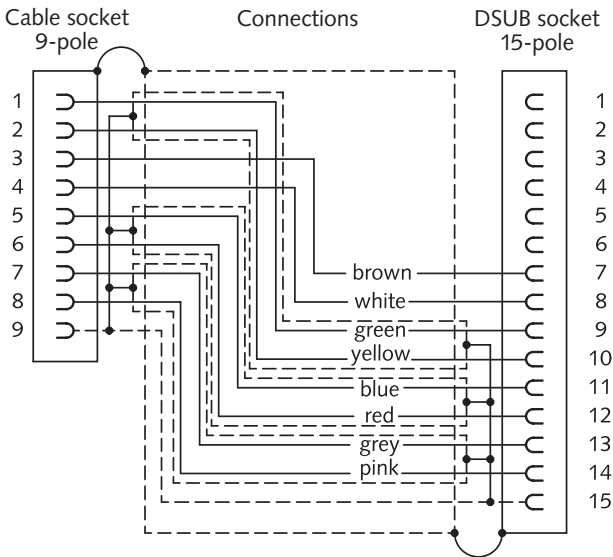


Fig. 8: Wiring of connecting cable Type 1481A...

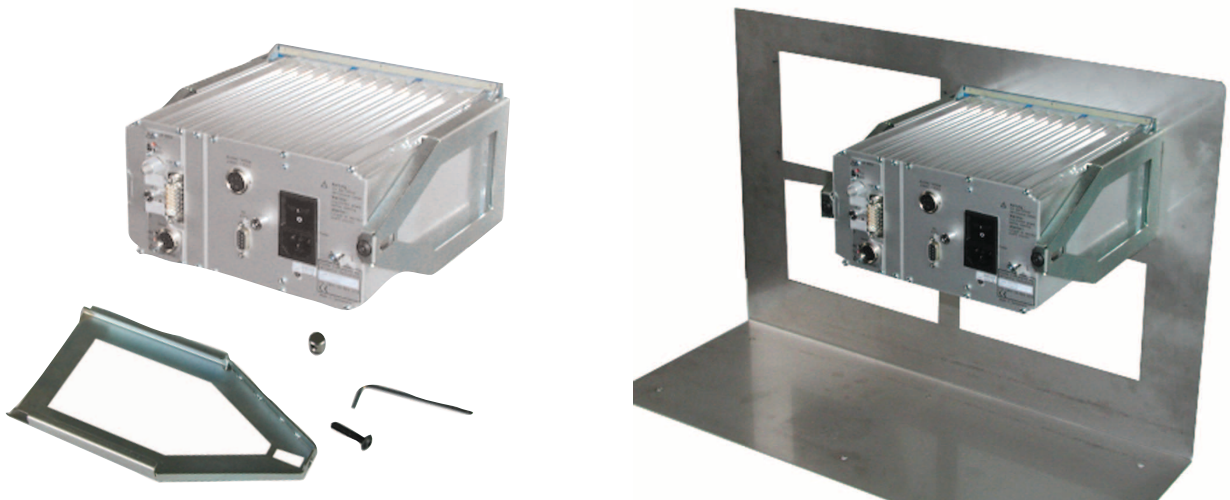


Fig. 9: Panel mounting Type 5857B...

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