COMPACTION METER CM-2.

INSTALLATION MANUAL

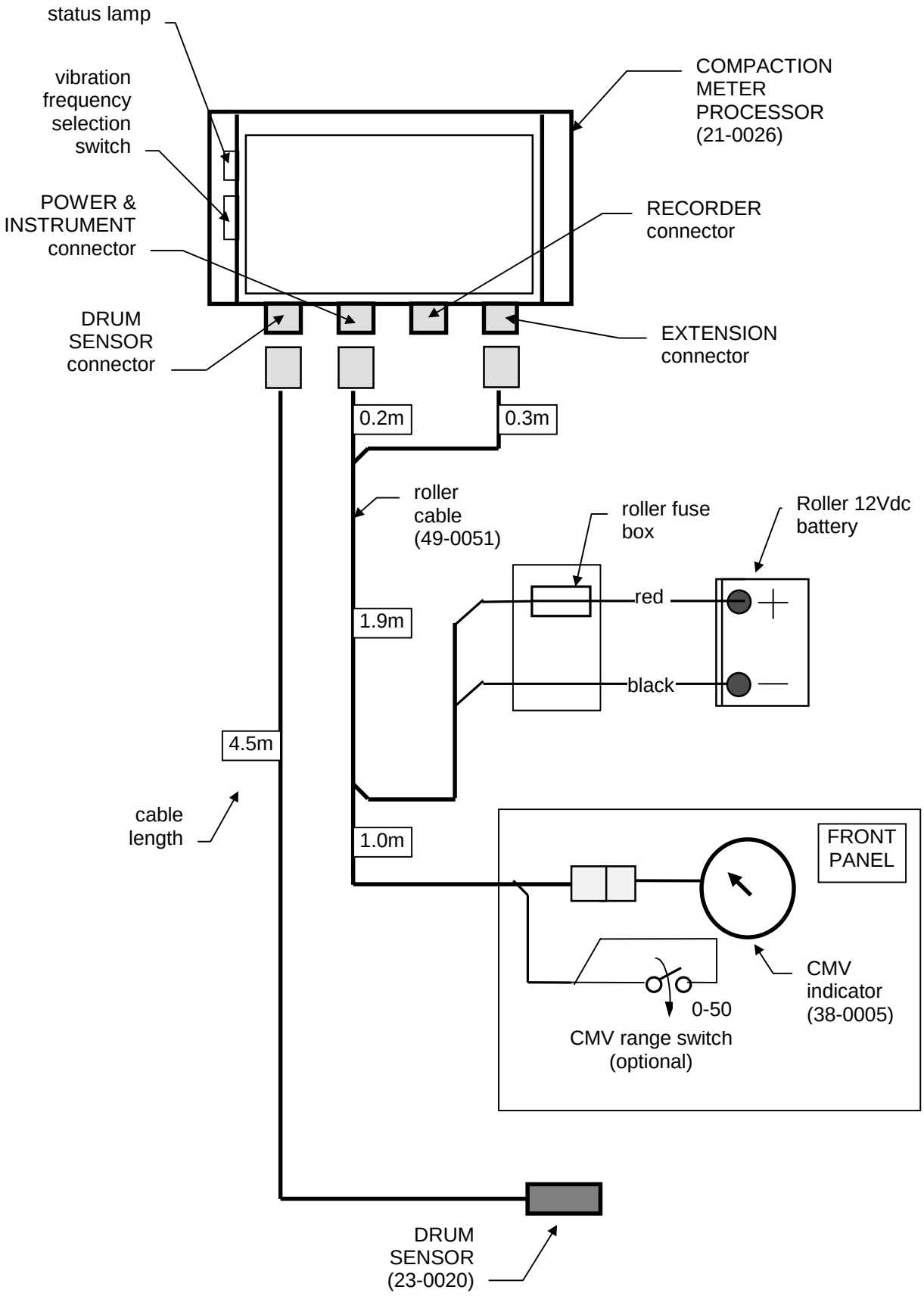
Contents : page

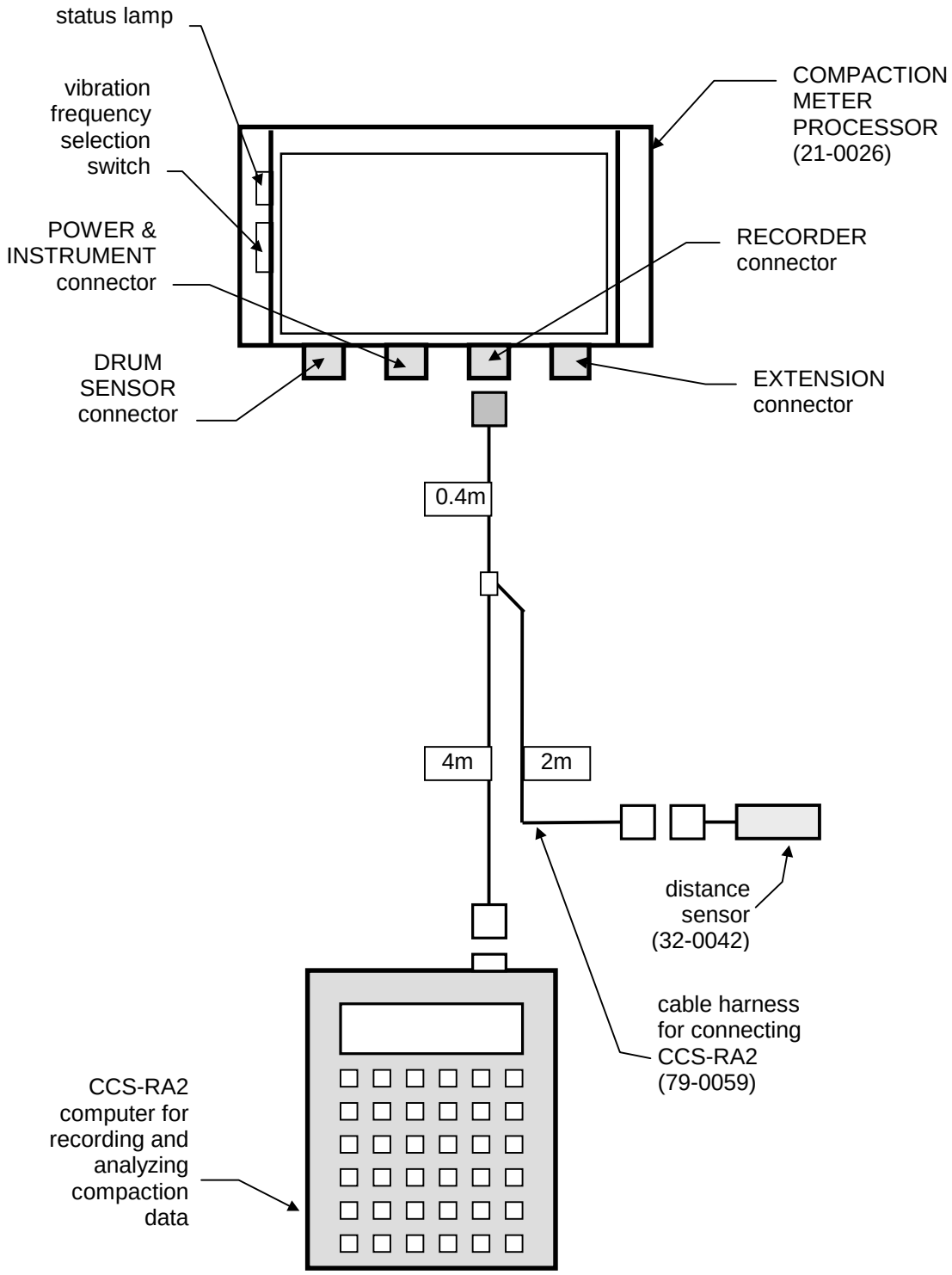
Compaction meter installation kit

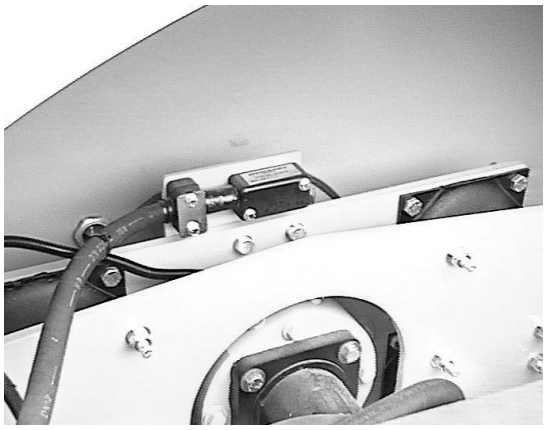
The kit consists of the following parts and documents:

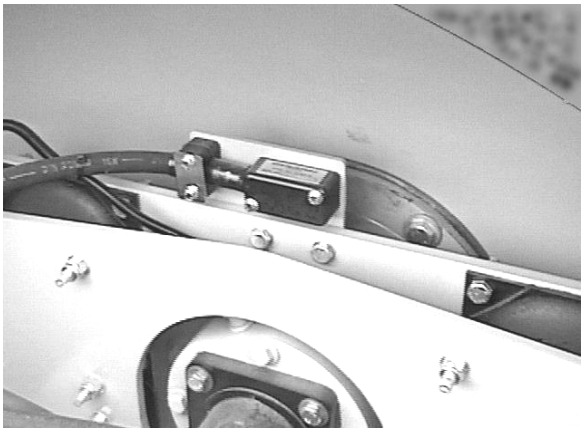
Part	ULFIA part no.	no. of items
drum vibration sensor	23-0020	1
sensor mounting plate	79-0392	1
sensor mounting kit	79-0407	1
compaction meter processor	21-0026	1
CMV indicator instrument	38-0005	1
interconnection cable harness	49-0051	1

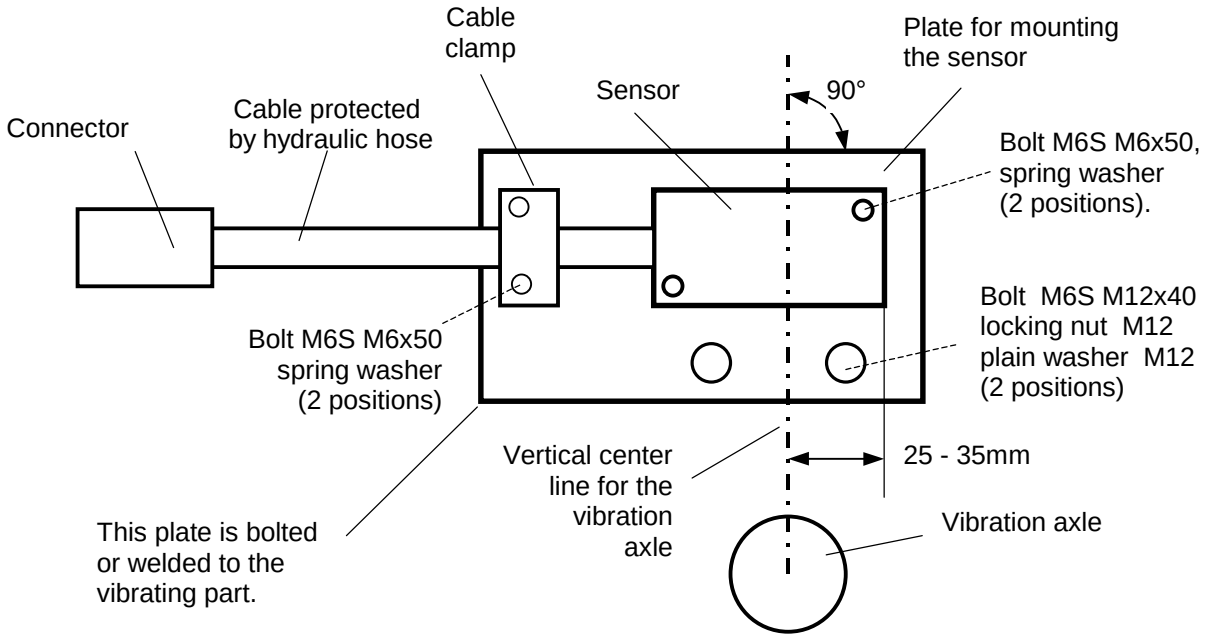
Document	ULFIA document no.
CM2 installation manual (this manual)	11-0027-3500-64
CM2 interconnection diagram	11-0027-1500-63
CMP-2B compaction meter operating manual	21-0026-3200-64
CM2 troubleshooting manual	11-0027-3400-64


status lamp
vibration frequency selection switch
POWER & INSTRUMENT connector
DRUM SENSOR connector
COMPACTION METER PROCESSOR (21-0026)
RECORDER connector
EXTENSION connector
0.2m
0.3m
roller cable (49-0051)
roller fuse box
Roller 12Vdc battery
red
black
1.9m
4.5m
cable length
1.0m
FRONT PANEL
CMV indicator (38-0005)
0-50
CMV range switch (optional)
DRUM SENSOR (23-0020)


status lamp
vibration frequency selection switch
POWER & INSTRUMENT connector
DRUM SENSOR connector
COMPACTION METER PROCESSOR (21-0026)
RECORDER connector
EXTENSION connector
0.4m
4m
2m
distance sensor (32-0042)
cable harness for connecting CCS-RA2 (79-0059)
CCS-RA2 computer for recording and analyzing compaction data







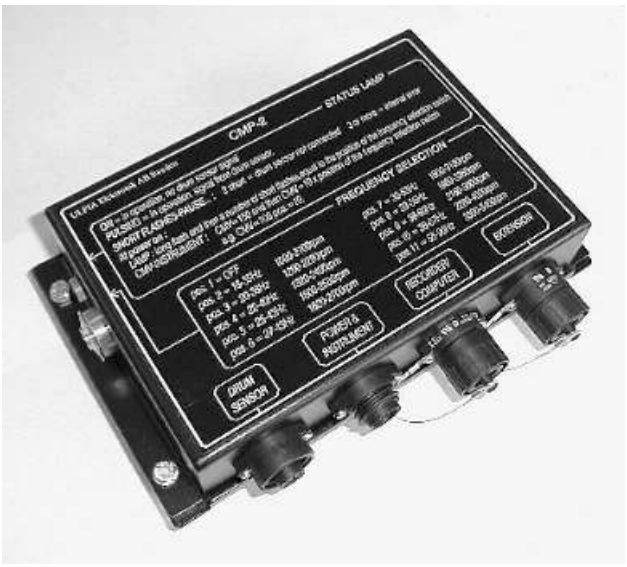
The sensor is the device that converts the acceleration of the vibrating drum into an electrical signal. The electrical signal is used by the processor to determine the CMV(Compaction Meter Value), which is a relative value for the degree of compaction.

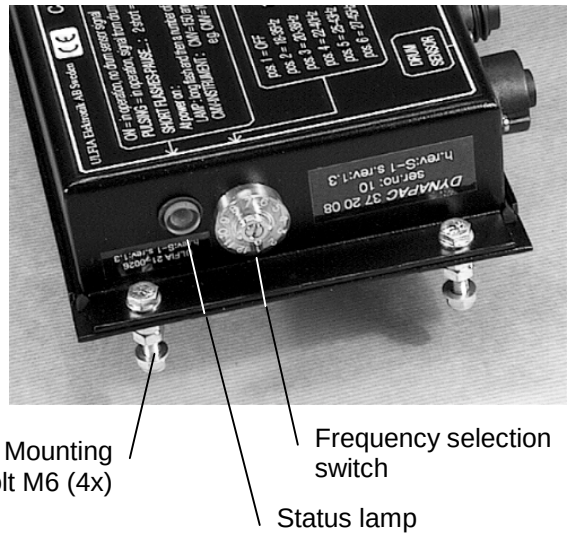
The sensor must be mounted according to the figure above to give the best measurements.

The plate is bolted or welded to a vibrating part that is in direct mechanical contact with the vibrating drum.

ATTENTION !! Don't mount the plate with the sensor on a part that is <u>isolated for vibrations</u>.

Tighten the bolts strongly.
The sensor cable with its protecting hydraulic hose should be strapped to some rigid parts on its way to the CMV processor.



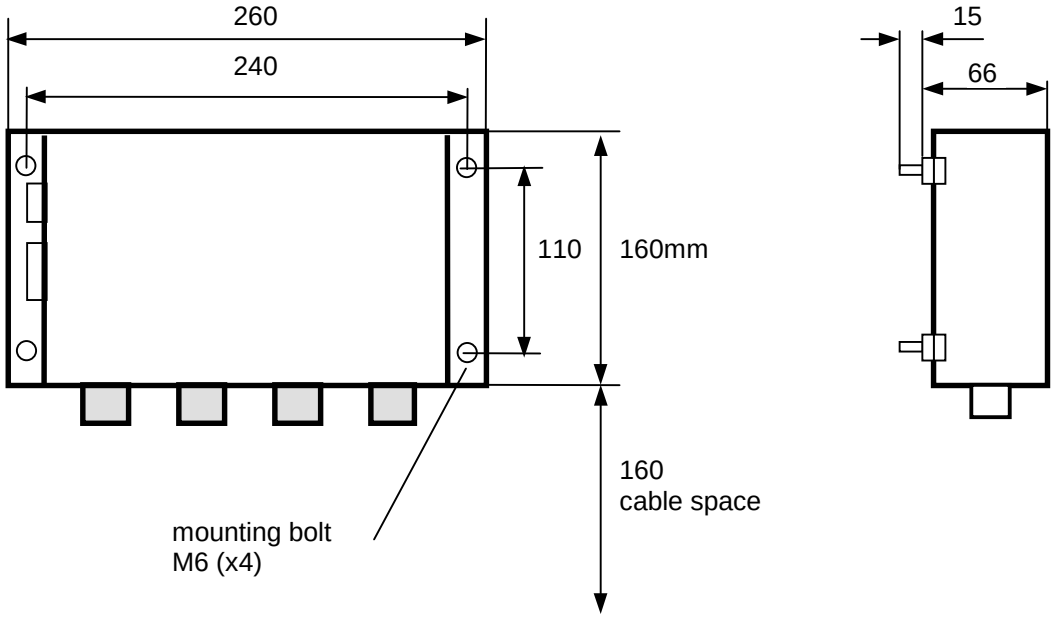


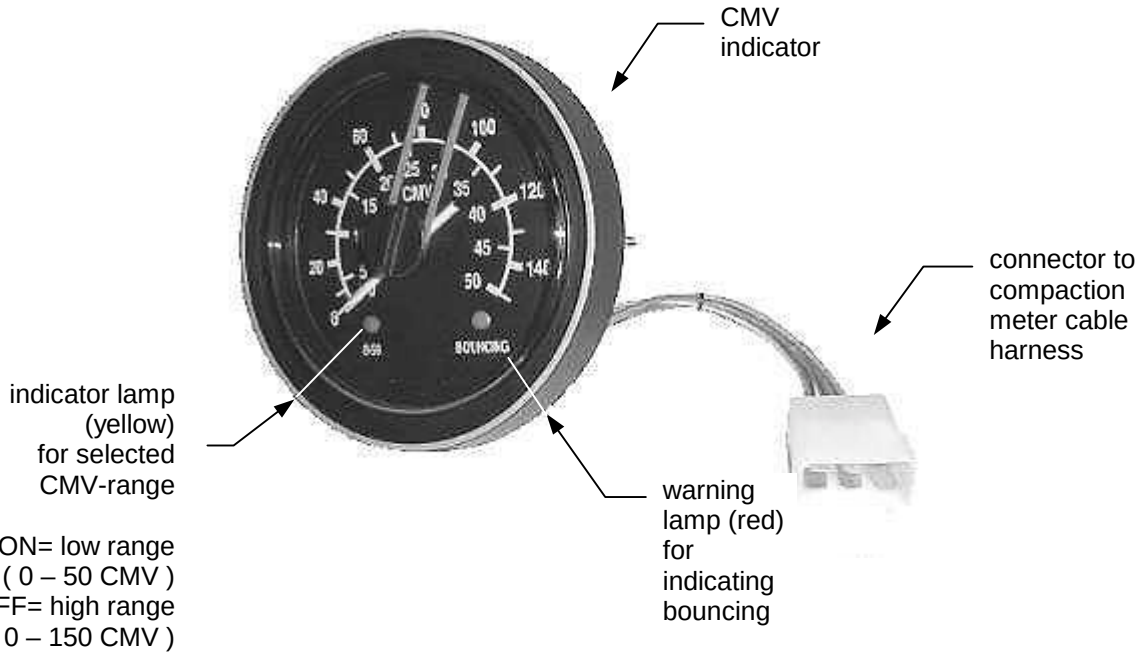
The processor is the part in the compaction meter system that determines the CMV(Compaction Meter Value) from the drum sensor signal.

Data for processor CMP-2B :

Power supply voltage : 11- 15Vdc
Current consumption : 200mA
Protected against wrong polarity on power supply lines.
Sealing: IEC IP64 when cable connectors or protection caps are mounted.
Case: 2mm steel

Dimensions:

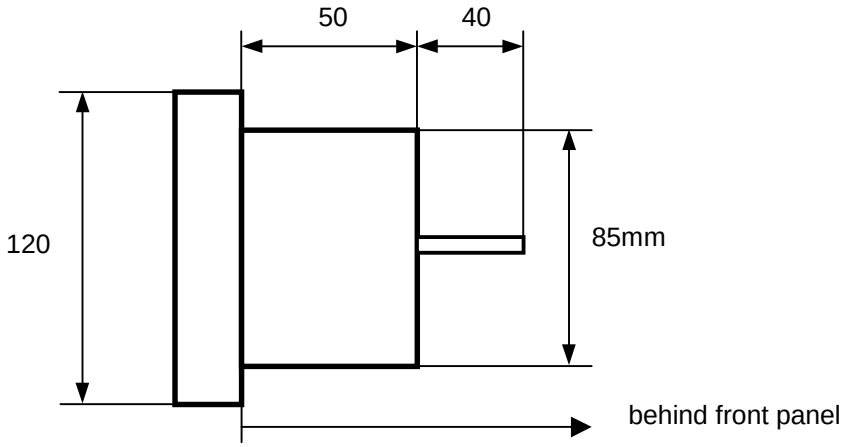




Electrical data:

CMV indicator: voltage for full scale indication: 5V
internal resistance: 500ohm

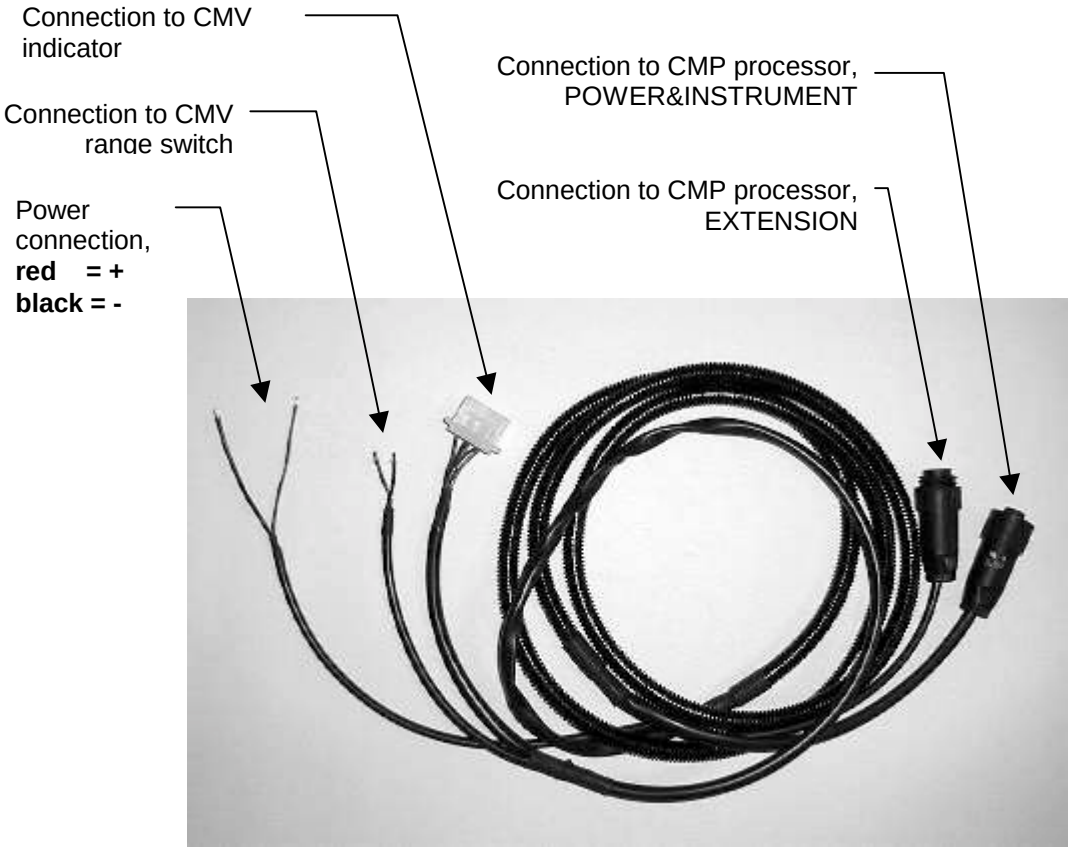
Dimensions :



For mounting the instrument a hole with diameter 87mm has to be cut in the front panel.

The indicator is locked to the front panel with the clamp on the rear side of the indicator.

Connect the cable harness as shown in the system configuration diagram, see page 2.



If the range switch is not used, please isolate the wire ends intended for the switch.

Power on self test :
When the power is switched on, the CMV-instrument should indicate the following sequence of values if the processor and instrument works correctly.

1. The CMV-instrument needle is set to 150.
The BOUNCING- and CMV-range(0-50) lamp is switched on.

2. The CMV-instrument will be set to a value corresponding to 10x the position of the frequency selection rotary switch, e.g. position 4 will give CMV=40.
The STATUS lamp on the processor will flash,
one long flash and then a number of short flashes (1 to 12), that indicates the position of the frequency selection rotary switch.

3. The BOUNCING- and CMV-range lamp is switched off.

4. The STATUS-lamp on the processor will go ON to indicate that the CMP-2B unit is ready for operation.

5. The CMV-instrument goes to 0 (zero).

Vibration is switched on :
When vibration is switched on, the STATUS-lamp should start pulsing as long as the drum is vibrating.
When the drum is placed on soft ground material, the CMV-value should be about 0(zero).
If the drum is placed on a stiff material there should be a reading higher than 20.

The STATUS-lamp on the processor is also used to indicate error conditions for the CMP-2B unit. The meaning of the flashing codes are also explained on the front panel label.

The following errors are indicated:

flash sequence :	**S**=short flash	**---** = pause	**...** = the flashing sequence is repeated
SS ---SS---... :	code 2	: wrong DC-voltage-signal from the drum acceleration sensor (2 flashes)	
SSS---SSS---... :	code 3,4	: internal hardware error (3 or 4 flashes)	
SSSSS---SSSSS---... :	code 5-9	: internal software error (5 to 9 flashes)	

If the CMP-2B is indicating an error condition, try the following for the different errors:

STATUS-lamp is not pulsing when the drum is vibrating :

check that : the sensor is connected to the CMP-2B unit,
the sensor is correctly mounted on the roller,
the amplitude and frequency of the drum is correct
(use the FA-meter (Frequency Amplitude) from ULFIA, part no. 14-0006)

Flash-code 2 :

check that : the sensor is connected to the CMP-2B unit,
the cable to the sensor is not damaged,
the power supply voltage to the CMP-2B is correct.

Flash-code 3,4 :

Check that the power voltage to the CMP-2 is correct.
Switch off and on the power several times. If the error message still exists,
the unit should be replaced, because there is something wrong with the electronics inside the unit.

Flash-code 5 to 9 :

Check that the power voltage to the CMP-2 is correct.
Switch off and on the power several times. If the error message still exists,
the unit should be replaced, because there is something wrong with the electronics inside the unit.

ATTENTION :

Please check that you have set the frequency switch to the correct position before you start to troubleshoot!