Wipe Angle Meter
WWM200 SW:2.51
Instruction Manual 3.2

The WWM200 Wipe Angle Meter reads the actual wipe angle of a one or two wipers. The actual value is shown on a LCD Display. The MIN and MAX values are printed on a small dot matrix printer. The Wipe Angle Meter is designed for mobile or steady operation. 2 interfaces for PC and oscilloscope make it possible to store and display the values. Additionally it is possible to calculate and display the actual wipe frequency.

Attention!

The device may not be taken into operation as soon as every user has read and understood the manual.
Every unintended use is prohibited.
The users have to be trained in handling the device.
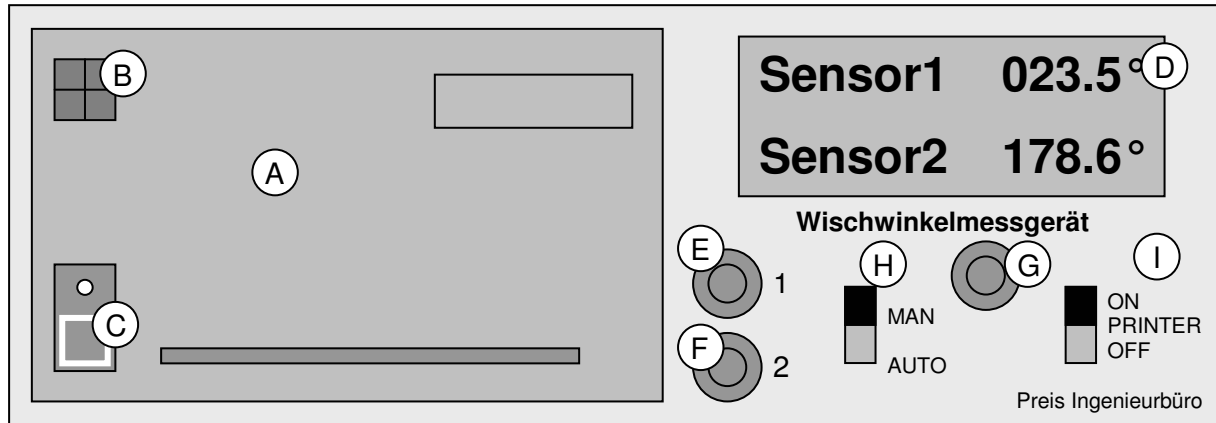
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Controls

Front panel

A: Dot matrix printer
B: Renew the paper roll and ink ribbon
C: Manual paper feed
D: LCD diplay with background light
E: Reset button Sensor 1   press quick: reset this channel to 0.00°
                                                    Press for a while : channel switch on off
F: Reset button Sensor 2
G: Button to print the actual angle value.
H: Switch between manual and automatic mode
I: Switch dot matrix printer on/off
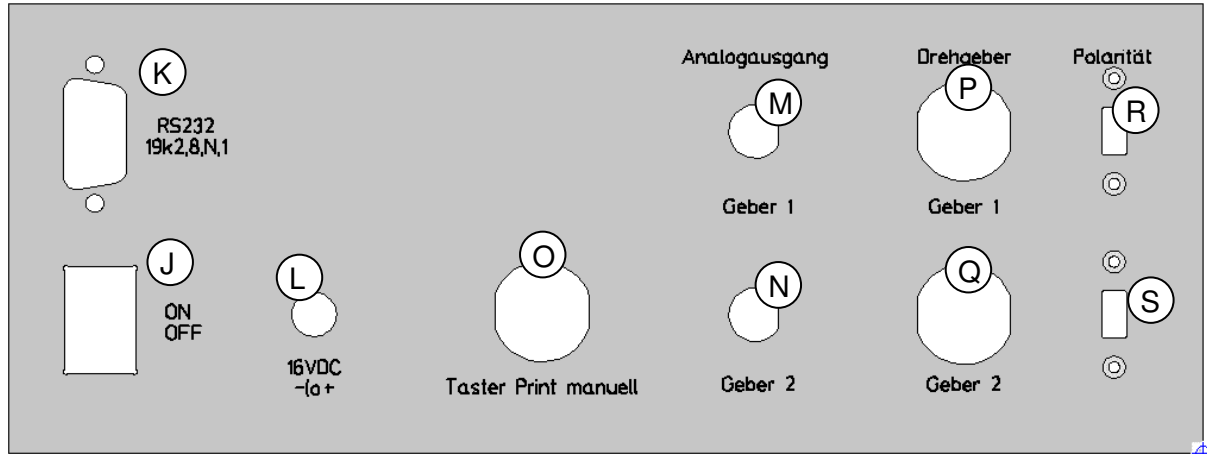
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Controls / plugs

Back panel

J: Power switch
K: 9pol SUB-D plug for communication with PC or laptop
L: Power plug
M: fast analog output channel 1 – connect to oscilloscope
           1.800V=360°
           Offset 1.800V=0°
N: fast analog output channel 2
O: external "PRINT-Manual"-Button
P: Sensor 1
Q: Sensor 2
R,S: Revers the direction of the counter

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Dot matrix printer

The dot matrix printer logs the MIN and MAX values.
Because of a higher resistance no thermo printer is used.

There are 3 possible modes

Mode 1:
   Printer off. (Saves paper and power). Useful while setting up the system.
   Switch on/off the printer with switch (I) on the front panel.

Mode 2:
   Continuous printing of the MIN and MAX angles. The values of both channels are printed
   in 2 columns. In most cases the MIN and MAX value of both channels are not reached in
   at exact the same time. So if one channel is at its maximum, a short delay is inserted
   wait for the other channel.

Mode 3:
   If in manual mode the actual value of both channels is printed, of the button (G) is
   pressed. This button is also available as a connector on the back panel (O).
   Change between mode 2 and 3 with the switch (H) an the front panel.

Renew the paper roll and ink ribbon:

Open the front panel of the dot matrix printer with the screw (B) to change the paper roll or
the ink ribbon.

Press the feed button (C) when inserting a new paper roll.

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LCD display

In manual mode the actual angle value of both channels is displayed. Press button (G) on the front panel to freeze the value. Press this button a second time to go back to continuos mode.
In auto mode the MIN and MAX values are displayed.

Line 1: channel 1
Line 2: channel 2

The background light is only active with the power supply.

The display resolution is 0.05°. The maximum range: −360° .. +360°.

In normal mode the symbol "°" is appended. If the rotary speed exceeds 4rpm/sec/channel @ 900Imp-sensor the symblo "!" is displayed for about 1 second. In this case the actual angle value is not valid.

Funtion key

4 functions are realized with the button (E) and (F).

1. Reset the value (press quick)
2. Switch on/off the channel (press for 1 second)
3. Navigate in configuration mode
4. Activate the mode "Wipe Rate" (press (E) and (F)

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Mode Wipe Rate

Press both buttons (E) and (F) to switch to the mode "Wipe Rate". The time between Min/Max/Min Value is measured and the wipe rate in "wipes per minute" is calculated.

Press one of these buttons to go back to normal mode.

Configuration Mode

Press button (E), hold it pressed and switch on the Wipe Angle Meter to enter configuration mode.

First the language German/English can be selected with button (E) or (F).

Then, the sensor frequency 900imp,1800imp or 3600imp can be selected with button (E) .

Additionaly 2 formats can be selected.

000.0 or
000.00

After this the new configuration is stored and the Wipe Angle Meter restarts.

Serial Port

At the serial port you can connect a PC or Laptop and read and store the wipe angle values.

The port parameters are:

19200 baud, 8 data bits, no parity, 1 stopbit

The data is in a "*.CSV format". This is used by many programs such as MS EXCEL.

There are 3 columns:

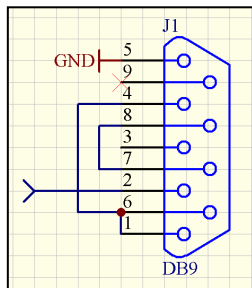In the first column there is a mark:
"x" for automatic mode MIN or MAX value
">" for manual mode.

The second columns contains the value for channel 1, the third the value for channel 2.

Example:

X;-180,0;36,5

Pinout

Analog Output

There are two analog outputs for a 2-channel oscilloscope. The voltage range ist from 0..3,600V. The angle values from -360° to +360° are scaled to this range. So 0° is equivalent to 1.8V
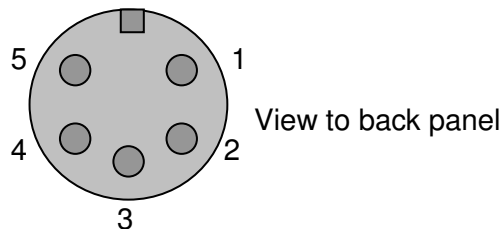
The oscilloskope must be at high impedance. (1Meg)

Angle Sensor

The Wipe Angle Meter hat 2 channels. The angle sensor must be a 5V Type.
The maximum speed ist 2rpm at one 1800lmp sensor.

Pinout of the sensor connector:

1- A
2- B
3- NC
4- Vcc (5V)
5- GND

View to back panel

Powe Supply

The Wipe Angle Meter can be supplied be a external power supply or by the internal lead gel accumulator. This accumulator is also recharged by the external power supply.
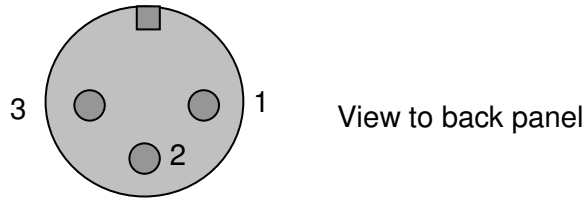
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Pinout external manual PRINT button:

1- BUTTON
2- BUTTON
3- frei

View to back panel
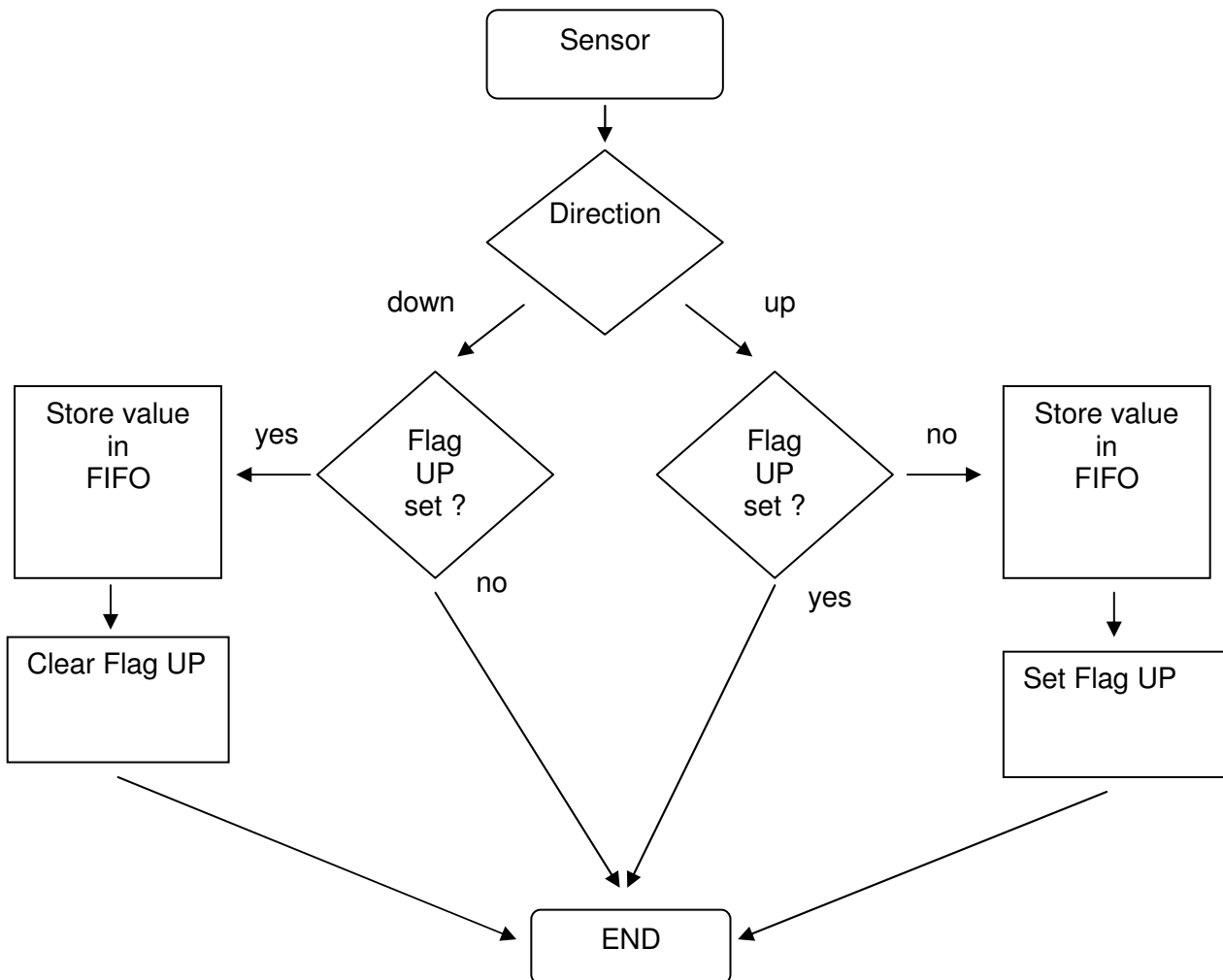
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Algorithm to detect the Min/Max- Values

```
                          ┌──────────┐
                          │  Sensor  │
                          └────┬─────┘
                               │
                               ▼
                            ◇ Direction ◇
                    down    /          \    up
                           ▼            ▼
   ┌──────────┐      ◇ Flag      ◇ Flag      ┌──────────┐
   │Store value│ yes │  UP   │   │  UP   │ no │Store value│
   │    in     │◄────│ set ? │   │ set ? │───►│    in     │
   │   FIFO    │     ◇       ◇   ◇       ◇    │   FIFO    │
   └────┬──────┘        no           yes      └────┬──────┘
        │                                          │
        ▼                                          ▼
   ┌───────────┐                              ┌───────────┐
   │Clear Flag │                              │ Set Flag  │
   │    UP     │                              │    UP     │
   └─────┬─────┘                              └─────┬─────┘
         │              ┌──────────┐                │
         └─────────────►│   END    │◄───────────────┘
                        └──────────┘
```

Only global MIN/MAX values are stored/displayed. A hysteres of 32 counts (1.6°
@1800Sensor) is inserted to surpress local maxima.

○ Detected as global MIN/MAX value.
◉ surpressed