	Instruction manual	microsonic
	wms-4/4D II control unit for 4 ultrasonic sensors of the wms-xxx/RT-series with 4 switching outputs	August 2002

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Instruction manual wms-4/4D II

1. Sensor types

Following ultrasonic wms- sensors can be operated in conjunction with wms- 4 control unit:

- wms-25/RT/HV (25cm range)
- wms-30/RT/HV (30cm range)
- wms-101/RT/HV (1m range)
- wms-301/RT/HV (3m range)
- wms-601/RT/HV (6m range)

Four independent switching outputs are available; each of them is assigned to one of the four sensor channels. The distance measured by the correspondent sensor is compared to the selected switching distance of the sensor channel; the output is switched accordingly then.
The switching outputs switch the positive voltage (20- 30 VDC, pnp - high side drivers) and can drive 500 mA each (protected against short circuit, overload and reverse polarity).
The supply voltage, the sensors and the switching outputs have to be connected according the wiring scheme on the front panel label.
Please note, that wms- 25/RT/HV or wms- 30/RT/HV cannot operate simultaneously with the typs wms- 301/RT/HV or wms- 601/RT/HV.

2. Operation modes

2.1 Normal mode

All active sensor channels show their activity by a cyclic flashing of the specific green LED in the 2nd line. Example: the green LED denoted as wms- 100 belongs to channel A1.
If the distance of an object falls below the selected switching distance of a sensor channel, the correspondant yellow LED of this channel is illuminated.
Two operating modes can be selected by the selection switch on the front panel (even when under operation):

- synchro mode
All active sensors are operated simultaneously, thus giving the opportunity to install these sensors close to one another.
- scan mode
All active sensors are operated subsequently one by one, thus permitting an installation of the sensors face to face.
Please note that the measurement repeat rate of each individual sensor is lower than for synchro mode.

2.2 Display mode

When pressing the UP or DOWN button during normal operation, the stored parameters of the sensor channels are shown subsequently with each key press.

yellow LEDs:	channel number
green LEDs (upper row):	sensor type connected to this channel
green LEDs n.o. / n.c. / REF:	function of switching output normally open or normally closed or reference sensor for temperature compensation

20 seconds after the last keypress the device automatically returns to the normal display mode; the same can be achieved by pressing UP and DOWN simultaneously.

2.3 Programming mode

Programming is done via 3 pushbuttons on the front panel:

- ↑ (UP, upwards)
- ↓ (DOWN, downwards)
- ENTER (confirmation)

The programming mode is entered by pressing the ENTER button for 3 seconds.

Step 1

One of the yellow LEDs A1 to A4 will start to blink, indicating the channel to be programmed. Pressing UP or DOWN changes the channel number; pressing ENTER will confirm the channel selection. The dedicated yellow LED is permanently illuminated now.

Step 2

One of the green LEDs in the upper row is blinking now. Pressing UP or DOWN changes the sensor type; by pressing ENTER the chosen sensor type on this channel will be confirmed.
When all green LEDs of the second row are flashing no sensor type is selected, i.e. this channel is deactivated then. Pressing ENTER now will consequently end the programming mode and return to the normal operation mode, leaving this channel deactivated.

Step 3

Within this step the output switching function of the selected channel will be determined. If the green LED marked by n.o. blinks, the output will switch the positive voltage, when the target distance falls below the selected switching distance; if the green LEDs marked by n.c. blinks, the output will carry positive voltage, unless the target distance falls below the selected switching distance.

If both LEDs blink, the sensor on this channel will be used for temperature compensation (REF).
UP or DOWN toggles between n.o / n.c. / REF; pressing ENTER confirms the choice.
When temperature compensation shall be activated, the reference sensor has to be directed against a target, that cannot move. If there is a deviation in the measurement values of this sensor in the future, this must be due to changes of the environmental conditions (air pressure and humidity level, especially temperature drift). With this deviation the measurements of other active sensors will be corrected.
Temperature compensation begins with pressing the ENTER button, the programming will be terminated here; this channel will not have an output function. A valid distance towards a target within the detecting range of the selected sensor type must be found, when pressing the ENTER button (for example between 300 and 3000 mm on wms-300/RT sensor); otherwise the program will remain here, until a valid measurement value is present or no button is pressed for 20 sec (-> automatic cancellation of programming mode). If another sensor was declared to be the reference sensor before, its referencing function will be switched off returning to its normal switching output mode (n.o. / n.c.) as selected in the past.
If a sensor is declared to be a temperature reference sensor, all measured distances refer to that air temperature, which was present, when temperature compensation was activated. If the switching distances of other active sensors have been adjusted at a temperature different from the current temperature, these distances should be readjusted now. (-> Step 4)

Step 4

Within this last step the switching distance of the specific sensor channel is adjusted; the green LED marked by SD blinks. The switching distance can slowly be increased by continously pressing UP, decreased by pressing DOWN. If the selected distance matches with the minimum and maximum limits, the LED flickers.
During the programming of a switching distance there is no switching hysteresis on this channel. Pressing ENTER confirms the adjustment.

The switching distance can also be adjusted by pressing UP and DOWN simultaneously. In this case the switching distance is set exactly to the distance of a default target, which has been placed in front of the sensor. The switching distance can be learned this way.
Please notice: If no target is present when learning, the value will be set to the maximum switching distance of the specific sensor type.

General information

In the programming mode one should keep the following in mind:

- A blinking LED indicates, what is currently about to be programmed
- If a selection has been confirmed, the correspondent LED will remain illuminated permanently

Single steps can be skipped by pressing the ENTER button at once; the previous selec-

tion will be maintained. If a false selection has been made, this error can by corrected by not pressing any button for 20 seconds. An automatic cancellation of the programming mode will be performed, refreshing all previous selections of this channel (sensor type, swiching function and swiching distance).
If the programming is continued up to the last step, the new selections for the specific channel will be stored permanently.
In order to program all four channels of wms- 4 the programming mode has to be entered separately for each channel (by pressing the ENTER button for 3 seconds).

2.3.1 Programming Mode - Transfer of parameters to other channels

It is possible to transfer the parameters from one sensor channel to all the other. To do this, follow the following steps:
Enter the programming mode for the channel, you want to transfer the parameters from (pressing the ENTER button for 3 sec., release the button and choose the channel by pressing UP or Down).
Press the ENTER button again. After 0,5 sec all yellow LED of the aktiv channels an the LED TYPE, N.O./N.C., DIST are flashing. If you hold the ENTER Button for 5 seconds, all parameters will be transfered to the other aktiv channels. The wms-4/4D II will return to normal operation mode.
Its possible to transfer only specific characteristics as well. If for example the parameter N.O./ N.C. has to be transfered, the programming step for this parameter has to be entered (see 2.3). By pressing the ENTER button for 5 seconds after selecting the output switching function, only this parameter will be transfered.

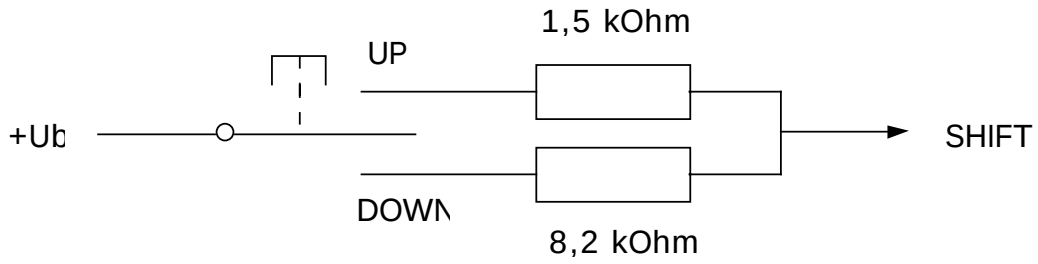
Please notice:

- The parameters can only be transfered to aktiv channels, inaktiv channels will stay inaktiv.
- Parameters cannot be transfered to the reference channel.
- Parameters cannot be transfered from the reference channel.

2.4 Optional SHIFT mode

This operation mode allows the switching distances to be modified. To enable this function, a special switch must be installed (see picture below). By pressing UP or DOWN all switching dintances are moved in the same direktion, UP moves the switching distance away from the sensor, DOWN towards the sensor. The speed at which the switching distances are moved can be selected by the SYNC/SCAN switch (SCAN = slower shift than SCAN).
During the adjustment, the operation of the controller is not interrupted. All changes take effekt immediately. After releasing the SHIFT buttom the wms-4/4D II returns in the normal operation mode and the switching distances are stored.

Connection diagram for SHIFT mode



3. Front panel