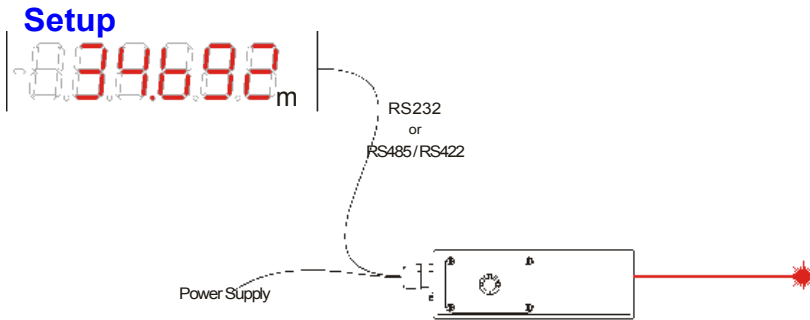


## MRL3 - Application note A1 003 - Use of an External Display

This application note describes the direct connection of an external display to the MRL 3 over the RS232 or RS422/RS485. Furthermore, two example are given to show the flexibility of the MRL 3 configuration.

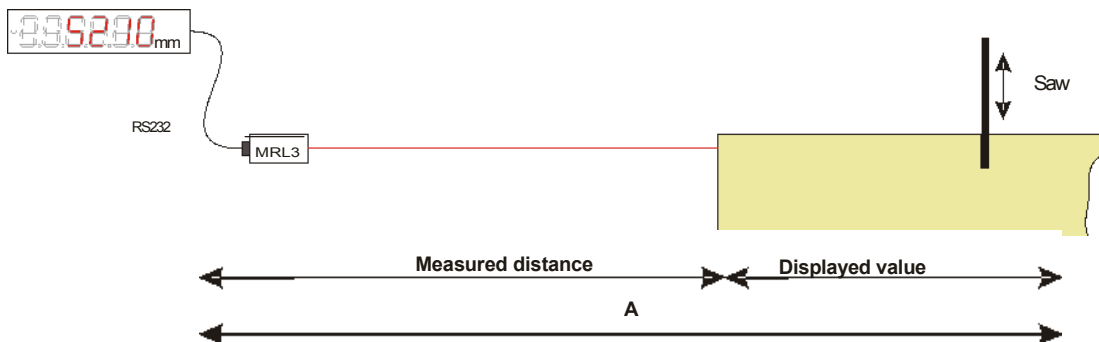


The MRL3 is able to add an offset (positive or negative) to the measured value and multiply the sum with a gain factor. This gain factor is defined by a numerator (Num) and a denominator (Den) for maximum flexibility.

$$\text{Output value} = (\text{Measured distance} + \text{Offset}) \cdot \frac{\text{GainNum}}{\text{GainDen}}$$

### Determining the length of a piece to be cut

This application displays the length of a piece to be cut by measuring from a remote location. The calculation for the displayed value is as follows:



$$\text{Displayed Value} = A - \text{Measured distance}$$

To set up the MRL-B, offset and gain factor are needed:

$$\text{Displayed value} = (\text{Measured distance} + \text{Offset}) \cdot \frac{\text{GainNum}}{\text{GainDen}}$$

with:

Offset	=	-A
GainNum	=	-1
GainDen	=	+1

**Configuration example 1**

Guidelines:

- Display value in mm (e.g. 2675mm)
- Measuring starts by the external trigger (continously)
- A = 10000mm

Configuration command		Remarks:
Command	Successful Return	
sNDI 1+6	gNDI 1?	Activating Digital input – Tracking mode
sNuof-100000	gNuof?	Offset of 10000mm (value in 1/10 mm = 100000)
sMuga-1 +1	gNuof?	Gain of -1 (GainNum / GainDen)
sNuo+107	gNuo?	Output of 7 digits – no digits after decimal point

To save the new settings, please use the "Save configuration parameters"-command (sNs).

**Configuration example 2**

Guidelines:

- Display value in m (e.g. 5.259m)
- Measuring starts by the external trigger (continously)
- B = 10000mm

Configuration command		Remarks:
Command	Successful Return	
sNDI 1+6	gNDI 1?	Activating Digital input – Tracking mode
sNuof-100000	gNuof?	Offset of 10000mm (value in 1/10 mm = 100000)
sMuga-1 +10	gNuof?	Gain of -0.1 (GainNum / GainDen)
sNuo+137	gNuo?	Output of 7 digits – 3 digits after decimal point

To save the new settings, please use the "Save configuration parameters"-command (sNs).

**Important Notices:**

After a device-reset the configurations will be set back to their default values.

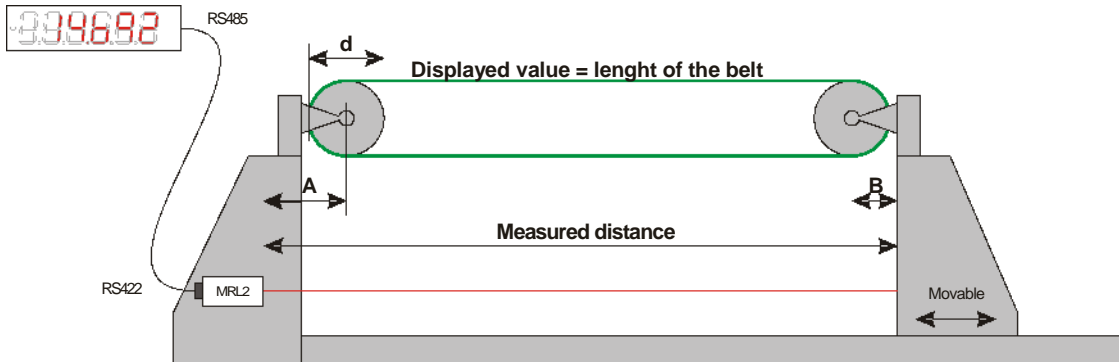
For detail descriptions of commands and connectivities look in the manual 'External display on MRL2'

● available from MRC.



### Determining the length of a belt

In this Application the length of a belt will be displayed on the external display. The calculation for the displayed value is as follows:



$$\text{Displayed Value} = ((\text{Measured distance} - (A + B)) \cdot 2) + (\pi \cdot d)$$

$$\text{Displayed Value} = 2 \cdot \text{Measured distance} - 2 \cdot (A + B) + (\pi \cdot d)$$

$$\text{Displayed Value} = 2 \cdot (\text{Measured distance} - (A + B)) + \frac{\pi \cdot d}{2}$$

↓ Gain
Offset

#### Configuration example

Conditions:

- Display value in m (e.g. 12.458m)
- Measuring starts by the external trigger (continuously)
- A = 375mm
- B = 275mm
- d = 200mm

with: Offset = -335.8mm  
 GainNum = 2 (for calculation)  
 GainDen = 10 (for demanded display format)

Configuration command		Remarks:
Command	Successful Return	
sNDI1+6	gNDI1?	Activating Digital input – Tracking mode
sNuga+2+10	gNuof?	Gain of 0.2 (GainNum / GainDen)
sNuof-3358	gNuof?	Offset of -335.8mm (value in 1/10 mm = 3358)
sNuo+137	gNuo?	Output of 7 digits – 3 digits after decimal point

To save the new settings, please use the "Save configuration parameters"-command (sNs).

#### Important Notices:

After a device-reset the configuration will be set back to it's default values.

- For detail descriptions of commands and connectivities look in (ask for) the manual 'External display on
- MRL-B available from MRC.