NMG2
Quick Reference

SETUP

1. Connect Sensor to unit.
2. Switch on unit, upper display will show S-nr and lower display will show the unit software release. Unit will beep once.
3. All buttons should be out.
4. Press Button 1 ‘in’ to the ”Adjust” position.
5. Move the machine to its start point.
6. Reset the system by pressing and releasing Button 5 ”zero”.

Velocity Measurement

7. Adjust the reading of the lower display to +2 for upward/cable extension measurement or -2 for downward/cable retraction measurement.
8. If the measurement involves extending the cable Button 3 should be ‘out’ indicating the ”Up” position; if the measurement involves retracting the cable Button 3 should be ‘in’ indicating the ”Down” position.
9. Press Button 6 ‘in’ to the”Velocity” position.
10. Press Button 1, this should now be indicating”Test Run” (button is ‘out’).
11. Run machine for one cycle.
12. Both displays should show ”- -”
13. Press and release Button 5 ”Zero” (unit should ‘beep’).
14. The upper display now shows the position of the cable at the point of maximum velocity; record this value. The lower display shows the maximum velocity.
15. Press Button 1 ‘in’ to the”Adjust” position

Stop-Time Measurement

16. Press Button 6, this should now be indicating”Stop Time” (button is ‘out’).
17. Adjust the start position using the jog wheel (figure shown in the upper display in step 14 – this indicates distance travelled at maximum velocity).
18. For light curtain test mount the actuator plunger on the magnetic bracket so that the plunger is close to the beams of the light curtain but not breaking them. When extended, the plunger must trigger the light curtain to off. This can be tested by pressing the end of the plunger shaft with a suitable tool.
19. Move the machine to its start position.
20. Press button 7 ‘in’ to the”Actuator” position.
21. Press Button 1, this should now be indicating”Test Run” (button is ‘out’).
22. Start the machine and allow to run. At the position of maximum velocity the actuator plunger will extend to break the light curtain beam and stop the machine.
23. The upper display will show the Stop Time; the lower display will show the Stop Distance.
24. If required, press button 4 ‘in’ to the ”Print On” to print the results of the test performed.

Calculation of the Safety Distance and setting of the parameters (presentable via printer or RS-232)

In the automatic measurement mode (MULTIPLE [8] pushed) the safety distance of the safety equipment (2-hand control, light curtain etc.) can be calculated. If the hand speed is not zero in the basic setting, the safety margin is calculated from the max. stop time. A number of measurements can be set.

The following formula is used:

$s = gr \cdot (t1 \cdot F1 + t2) + F2$ with

s = Safety distance in mm
gr = approach speed (adjustable in steps of 100 mm/s).
t1 = Measured stop time
F1 = Proportional addition factor for stop time (adjustable from 100 up to 200 %). Designated as [F1] in the basic setting
F2 = Addition to the safety distance (adjustable in steps of 10 mm)
t2 = Addition to the stop time (adjustable in steps of 10 ms)
Corresponds to the reaction time of the safety equipment

Examples:
The up-to-date valid standards and minimum safety distances must always be observed.

1. 2-hand control with cover (see EN ISO 13855)
   gr = 1600 mm/s; F1 = 100 %; F2 = 0 mm; t2 = 0 ms

2. Light curtain with a resolution ≤14 mm (see EN ISO 13855)
   gr = 2000 mm/s; F1 = 100 %; F2 = 0 mm (depending on the sensor detection ability); t2 = 20 ms (resp. other reaction time of the ESPE*).
   * Electro Sensitive Protective Equipment

3. Interlocking device associated with guards (see EN ISO 13855)
   gr = 1600 mm/s; F1 = 100 %; t2 = 0 ms; F2 = 0 mm (depending on the aperture)

Basic Setting of the Formula Parameters
The button TEST RUN/ADJUST must be set to ADJUST. Press the ZERO button (and hold), set the button TEST RUN/ADJUST to TEST RUN and then release the ZERO button.
Both displays show FUNC;END. Turn the jog wheel clockwise until [gr] will appear]. Press the ZERO button to achieve the setting mode for the hand speed, which can be adjusted now with the jog wheel. Then press the ZERO button. Now FUNC;END appears again.
After selection with the jog wheel set the parameters F1, F2 und t2 in the same way.
In addition a number of measurements can be set (parameter n). For n=0 the automatic measurement mode will be terminated by pressing ADJUST.
Press the button TEST RUN/ADJUST to leave the setting mode.

Example:

<u>Automatic Measurement with Safety Distance Calculation</u>
Set the NMG2 in the automatic measurement mode (SINGLESHOT/MULTIPLE pressed, button TEST RUN/ADJUST released). The printout shows the header with the assigned formula parameters. Start the machine. The machine will be stopped and the stop contact will be released. Proceed to the assigned number n of measurements, then terminate the automatic mesurement by setting the button TEST RUN/ADJUST to the ADJUST position. Minimum and maximum stop time will be determined and printed. The safety distance will be calculated by the max. stop time and the given formula parameters and then be printed.