# VARIMETER
# Speed Monitor
# BA 9055, AA 9050

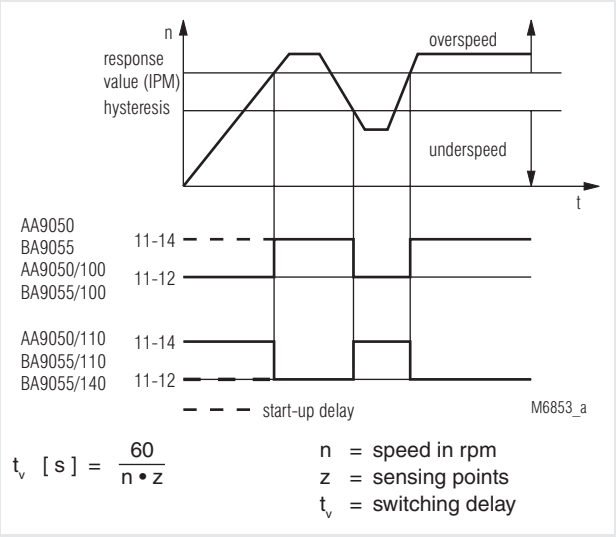
0225072


BA 9055


AA 9050

- According to IEC 255, EN 60255, VDE 0435 part 303
- Detection of
  - underspeed
  - overspeed
  - standstill
- Adjustable response value
- BA 9055 with adjustable start-up delay
- AA 9050 with adjustable hysteresis
- Width 45 mm

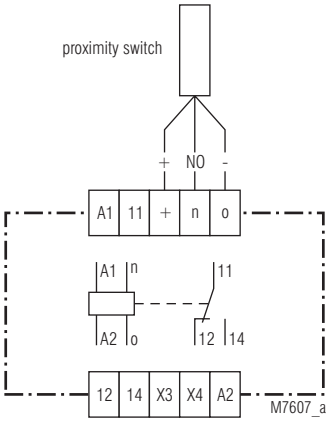
## Function Diagram




$$t_v\ [s] = \frac{60}{n \bullet z}$$

n = speed in rpm
z = sensing points
$t_v$ = switching delay

## Circuit Diagram




BA 9055.11, AA 9050.11

## Approvals and Marking

Canada / USA

* see variants

## Application

Speed monitors are used in case where it is necessary not to exceed certain speed limits in order to protect people plants and products against damage. The Speed monitors are used on escalators, conveyors, transfer lines, elevators as well as plants where several drives with a certain speed have to work together.

## Function

The measuring principle is to compare frequencies. With a proximity sensor the speed is converted to a speed proportional frequency. This frequency is compared to an internal adjustable frequency reference. If the measured frequency is higher then the reference the output relay is energized on an underspeed monitor or de-energized on an overspeed monitor. The output relay deenergises on an underspeed monitor if the speed goes under the setted hysteresis value. On the overspeed monitor the relay is energized. The reaction time is rather short, as the unit has no intergrating function. To calculate refer to formula in Function Diagram. The power supply for the proximity sensor is built into the unit. **The input is designed for pnp sensors.**
The speed monitor has an integrated start-up delay. The unit is delivered with a bridge between terminals X3-X4. The start-up delay is activated when the power supply is connected to A1-A2.
For the start- up time the output relay is energized. If no start-up delay is required, the bridge must be removed. The start-up delay can be activated also by external contacts connected to X3-X4.
The start-up delay normally is not required with overspeed monitoring. An LED indicates the connected power supply. A second LED indicates the state of the output relay.

## Technical Data

### Input Circuit

| | |
|---|---|
| **Input:** | for proximity sensors, built in power supply DC 24 V, max. 40 mA |
| **Setting range:** | 0.05 ... 0.5 lpm 10 ... 100 lpm<br>0.1 ... 1 lpm 50 ... 500 lpm<br>0.5 ... 5 lpm 100 ... 1 000 lpm<br>1 ... 10 lpm 500 ... 5 000 lpm<br>5 ... 50 lpm 1000 ... 10 000 lpm<br>lpm = Impuls per minute |
| **Min. pulse length:** | 1 ms |
| **Max. frequency:** | 30 000 lpm |
| **Setting:** | infinite on relative scale |
| **Setting accuracy:** | ≤ ± 3 % |
| **Response value:** | 0.1 ... 1 of end of scale value |
| **Hysteresis:** | |
| BA 9055: | 2 % of response value |
| AA 9050: | 2 ... 30 % of response value |
| **Accuracy:** | ≤ ± 1 % |
| **Temperature influence:** | ≤ ± 0.1 % /°C |

## Technical Data

**Influence of auxiliary supply:** < ± 0.5 % at 0.9 ... 1.1 $U_N$
**Start up delay**
BA 9055: 1 ... 20 s
AA 9050: 10 s (up to 60 min. available)

### Auxiliary Circuit

**Auxiliary voltage $U_H$:** AC 24, 42, 110, 127, 230, 240 V
DC 24 V
**Voltage range of $U_H$:**
AC: 0.8 ... 1.1 $U_H$
DC: 0.9 ... 1.2 $U_H$
**Nominal consumption:** < 4 VA
**Nominal frequency of $U_H$:** 50 / 60 Hz

### Output Circuit

**Contacts:** 1 changeover contac
**Thermal current $I_{th}$:** 6 A
**Switching capacity**
to AC 15: 5 A / AC 230 V IEC/EN 60 947-5-1
**Permissible switching frequency:** 6 000 switching cycles / h
**Short circuit strength**
**max. fuse rating:** 4 A gL IEC/EN 60 947-5-1
**Mechanical life:** > 30 x $10^6$ switching cycles

### General Data

**Operating mode:** Continuous operation
**Temperature range:** - 20 ... + 60°C
**Clearance and creepage distances**
rated impuls voltage / pollution degree: 4 kV / 2 IEC 60 664-1
**EMC**
Electrostatic discharge: 8 kV (air) IEC/EN 61 000-4-2
HF-irradiation: 10 V / m IEC/EN 61 000-4-3
Fast transients: 2 kV IEC/EN 61 000-4-4
Surge voltages between
wires for power supply: 2 kV IEC/EN 61 000-4-5
between wire and ground: 4 kV IEC/EN 61 000-4-5
Interference suppression: Limit value class B EN 55 011
**Degree of protection**
Housing: IP 40 IEC/EN 60 529
Terminals: IP 20 IEC/EN 60 529
**Housing:** Thermoplastic wiht V0 behaviour according to UL subject 94
**Vibration resistance:** Amplitude 0.35 mm, frequency 10...55Hz, IEC/EN 60 068-2-6
**Climate resistance:** 20 / 060 / 04 IEC/EN 60 068-1
**Terminal designation:** EN 50 005
**Wire connection:** 2 x 2.5 $mm^2$ solid or
2 x 1,5 $mm^2$ stranded wire with sleeve DIN 46 228-1/-2/-3/-4
**Wire fixing:** Flat terminals with self-lifting clamping piece IEC/EN 60 999-1
**Screw mounting**
AA 9050: 35 x 50 mm and
35 x 60 mm
**Mounting:** DIN rail IEC/EN 60 715
**Weight:**
BA 9055: 410 g
AA 9050: 400 g

### Dimensions

**Width x height x depth**
BA 9055: 45 x 74 x 124 mm
AA 9050: 45 x 77 x 127 mm

## Standard Types

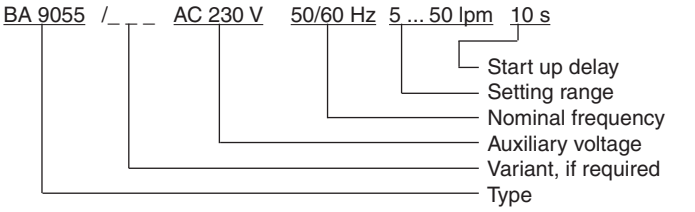
BA 9055 AC 230 V 50/60 Hz 10 ... 100 lpm 1 ... 20 s
Article number: 0030731
- Output: 1 changeover contact
- Nominal voltage $U_N$: AC 230 V
- Setting range: 10 ... 100 lpm
- Width: 45 mm

AA 9050 AC 230 V 50/60 Hz 10 ... 100 lpm 10 s
Article number: 0022920 stock item
- Output: 1 changeover contact
- Nominal voltage $U_N$: AC 230 V
- Setting range: 10 ... 100 lpm
- Start up delay: 10 s
- Width: 45 mm

## Variants

BA 9055, AA 9050: Standstill and underspeed monitoring with start up delay, closed circuit operation
overspeed monitoring with start up delay, open circuit operation
BA 9055/61: with UL-approval
BA 9055/100, AA 9050/100: Standstill and underspeed monitoring without start up delay, closed circuit operation
overspeed monitoring without start up delay, open circuit operation
BA 9055/110, AA 9050/110: Standstill and underspeed monitoring without start up delay, open circuit operation
overspeed monitoring without start up delay, closed circuit operation
BA 9055/140: Standstill and underspeed monitoring with start up delay, open circuit operation
overspeed monitoring with start up delay, closed circuit operation

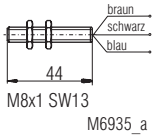
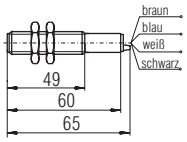
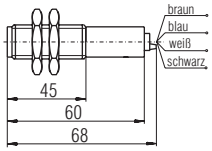
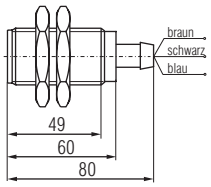
**Ordering example for variants**




## Accessories

K 70-34: Cover for AA 9050

## Initiators (proximity sensors), induktive

| Type | NA 5001.01.10 pnp<br>NA 5001.01.20 npn | NA 5002.01.34<br>pnp/npn | NA 5005.01.34<br>pnp/npn | NA 5010.01.10 pnp<br>NA 5010.01.20 npn |
|---|---|---|---|---|
| Dimensions |  <br>M8x1 SW13<br>M6935_a |  <br>M12 x 1 SW 17<br>M6936_a |  <br>M 18 x 1 SW 24<br>M7032_a |  <br>M30 x 1,5 SW 36<br>M7033_b |
| Enclosure | Metal | Metal | Metal | Metal |
| Switching distance $S_n$ | 1 mm | 2 mm | 5 mm | 10 mm |
| Switching frequency | 5 000 Hz | 1 000 Hz | 300 Hz | 200 Hz |
| Hysteresis | 2 ... 10 % | | | |
| Repeat accuracy | 5 % | | | |
| Voltage range | 10 ... 30 V | | | |
| Residual ripple | < 10 % | | | |
| Continuous current | ≤ 200 mA | ≤ 100 mA | ≤ 100 mA | ≤ 400 mA |
| Output | .10 pnp NO<br>20 npn NO | .34<br>pnp NO + npn NO | .34<br>pnp NO + npn NO | .10 pnp NO<br>.20 npn NO |
| Indication of output state | LED | | | |
| Ambient temperature | - 25 ... 70°C | | | |
| Temperature influence | 10 % | | | |
| Degree of protection | IP 67 | | | |
| Connection wire | 2 m | | | |
| Fixing torque | 4 Nm | 15 Nm | 40 Nm | 100 Nm |
| Weight | 45 g | 70 g | 120 g | 270 g |

### Connection Table BA 9055, AA 9050

| Type | Wire | Terminal on AA 9050 / BA 9055 |
|---|---|---|
| NA 5001.01.10 | brown + | + |
| | blue - | 0 |
| | black NO | n |
| NA 5002.01.34<br>NA 5005.01.34 | brown + | + |
| | white + | + |
| | blue - | 0 |
| | black NO | n |
| NA 5010.01.10 | brown + | + |
| | blue - | 0 |
| | black NO | n |

### Connection Table BA 9055 / _ _5

| Type | Wire | Terminal on BA 9055 |
|---|---|---|
| NA 5001.01.10 | brown + | + |
| | blue - | 0 |
| | black NO | n |
| NA 5002.01.34<br>NA 5005.01.34 | brown + | + |
| | white NO | n |
| | blue - | 0 |
| | black - | 0 |
| NA 5010.01.10 | brown + | + |
| | blue - | 0 |
| | black NO | n |

**Initiatoren NA 5002.01.34 and NA 5005.01.34 only usable for units without initiator-detection!**