# ➜ Speed control relay - 35 mm

- Control of overspeed, underspeed, operating rate, stopping
- Measurement via discrete sensors - 3-wire PNP or NPN, Namur, voltage 0-30V or volt-free contact type
- Works with either NO or NC sensors
- Time between pulses adjustable from 0.05 s to 10 min.
- Power-on inhibit time, adjustable from 0.6 to 60 s
- Inhibit time can be managed via an external contact

HSV

## Part numbers

| Type | Nominal voltage (V) | Code |
|---|---|---|
| HSV | 24 → 240 V ~ | 84874320 |

## Product adaptations

custom'able

- Customisable colours and labels
- Possible to delete settings
- Fixed threshold in the generic measurement range
- Fixed or adjustable time delay

## Accessories

| Description | Code |
|---|---|
| Removable sealable cover for 35 mm casing | 84800001 |

## General characteristics

| | |
|---|---|
| **Supply** | |
| Supply voltage Un | 24 V → 240 V ~ |
| Voltage supply tolerance | -15% / +10% |
| Operating range | 20.4 V → 264 V ~ |
| Polarity with DC voltage | No |
| ~ supply voltage frequency | 50 / 60 Hz ±10% |
| Galvanic isolation of power supply/measurement | Yes |
| Power consumption at Un | 5 VA in ~ /3 W in ⎓ |
| Immunity from micro power cuts | 50 ms |
| **Inputs and measuring cicuit** | |
| Input circuit 3-wire sensors | PNP or NPN, 12V, 50 mA max. |
| Input circuit NAMUR sensor | 12 V / 1.5 KΩ * |
| Input circuit Contact | 12 V / 9.5 KΩ |
| Input circuit Voltage input | 0 V min. /30 V max. /9.5 KΩ<br>High state 4.5 V min.<br>Low state 1 V max. |
| Minimum pulse time | 5 ms in high and low state |
| Frequency of measured signal | 1.5 m Hz minimum, 22 Hz maximum |
| Measurement ranges | 0.5 s - 1 s - 5 s - 10 s - 1 mn - 5 mn - 10 mn |
| Threshold adjustment | 10 → 100% of the range |
| Fixed hysteresis | 5% of displayed threshold |
| Display precision | ±10% of full scale |
| Repetition accuracy with constant parameters | ± 0.5% |
| Measuring error with voltage drift | < 1% across the whole range |
| Measuring error with temperature drift | ± 0.1% / °C max. |
| **Timing** | |
| Maximum threshold crossing response time | 15 ms |
| Reset time S2 | 50 ms minimum (in memory mode) |
| Reset time | In memory mode (power break) : 1500 ms minimum |
| Inhibit time delay | On energisation: 0.6 → 60 s (0, +10% of full scale) |
| Repetition accuracy with constant parameters | ± 0.5% |
| Delay on pick-up | 50 ms |
| Display precision | ±10% of full scale |

## General characteristics

| | |
|---|---|
| **Output** | |
| Type of output | 1 single pole changeover relay |
| Type of contacts | No cadmium |
| Maximum breaking voltage | 250 V ~ / ⎓ |
| Max. breaking current | 5A ~ |
| Min. breaking current | 10 mA / 5 V ⎓ |
| Electrical life (number of operations) | 1 x $10^5$ |
| Breaking capacity (resistive) | 1250 VA ~ |
| Maximum rate | 360 operations/hour at full load |
| Operating categories acc. to IEC 60947-5-1 | AC 12, AC 13, AC 14, AC 15, DC 12, DC 13, DC 14 |
| Mechanical life (operations) | 30 x $10^6$ |
| **Insulation** | |
| Nominal insulation voltage IEC 60664-1 | 250 V |
| Insulation coordination (IEC 60664-1 / 60255-5) | Overvoltage category III: degree of pollution 3 |
| Rated impulse withstand voltage IEC 60664-1/60255-5 | 4 KV (1.2 / 50 µs) |
| Dielectric strength IEC 60664-1/60255-5 | 2 kV AC 50 Hz 1 min |
| Insulation resistance IEC 60664-1 / 60255-5 | > 500 MΩ / 500 V ⎓ |
| **General characteristics** | |
| Display power supply | Green LED |
| Display relay | Yellow LED |
| Inhibit display | Yellow LED |
| Casing | 35 mm |
| Mounting | On 35 mm symmetrical DIN rail, IEC/EN 60715 |
| Mounting position | All positions |
| Material: enclosure plastic type VO to UL94 standard | Incandescent wire test according to IEC 60695-2-11 & NF EN 60695-2-11 |
| Protection (IEC 60529) | Terminal block: IP20<br>Casing: IP30 |
| Weight | 120 g |
| Connecting capacity IEC 60947-1 | Rigid: 1 x $4^2$ - 2 x $2.5^2$ $mm^2$<br>1 x 11 AWG - 2 x 14 AWG<br>Flexible with ferrules: 1 x $2.5^2$ - 2 x $1.5^2$ $mm^2$<br>1 x 14 AWG - 2 x 16 AWG |
| Max. tightening torques IEC 60947-1 | 0.6 → 1 Nm / 5.3 → 8.8 Lbf.In |
| Operating temperature IEC 60068-2 | -20 → +50°C |
| Storage temperature IEC 60068-2 | -40 → +70°C |
| Humidity IEC 60068-2-30 | 2 x 24 hr cycle 95% RH max. without condensation 55°C |
| Vibrations according to IEC/EN60068-2-6 | 10 → 150 Hz, A = 0.035 mm |
| Shocks IEC 60068-2-6 | 5 g |
| **Standards** | |
| Marking | CE (LVD) 73/23/EEC - EMC 89/336/EEC |
| Product standard | NF EN 60255-6 / IEC 60255-6 / UL 508 / CSA C22.2 N°14 |
| Electromagnetic compatibility | Immunity EN 61000-6-2/IEC 61000-6-2<br>Emission EN 61000-6-4/EN 61000-6-3<br>IEC 61000-6-4/IEC 61000-6-3<br>Emission EN 55022 class B |
| Certifications | UL, CSA, GL<br>pending |
| Conformity with environmental directives | RoHS, WEEE |

**Comments**

The IEC 60947-5-6/1999-12 NAMUR standard does not impose the operating voltage (open circuit voltage) or the load resistance (source resistance of the control amplifier), but it defines the test conditions for which, using the sensor voltage/current characteristics with high and low impedance, the normal operating zones are specified. The great majority of NAMUR sensors use a 12 V supply voltage. Matching the load resistance to the operating voltage allows the nominal switching distance to be maintained.

## Principles

**HSV**

**Overview**
The HSV relay controls the speed (or, more strictly speaking, the operating rate, or frequency) of a process (moving walkway, conveyor, etc.) using discrete sensors:
- 3-wire PNP or NPN output proximity sensor
- voltage input 0 - 30 V
- NAMUR proximity sensor
- volt-free contact

It can be used to monitor under OR overspeed

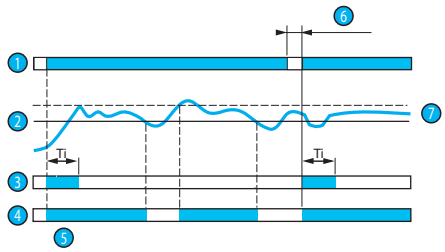
**Operating principle**
**Measurement**
The monitored process cycle is the succession of pulses characterised by a signal with two states: high and low. The speed measurement is obtained by measuring the duration of this signal, from the first detected change of state (either a rising or falling edge).
Digital signal processing avoids the problem of disparity of signals.
From energisation, or after the appearance (or reappearance) of the sensor signal, detection (characterisation) of the signal requires processing of one or more periods (two maximum).
During this time, control is inoperative.

**Operating mode**
Using the selector switch, select one of four modes:
- Underspeed without latching
- Underspeed with latching
- Overspeed without latching
- Overspeed with latching

If, on energisation, the switch is placed in one of the three intermediate positions (between "underspeed with latching" and "overspeed with latching"), the relay stays in the rest state ("alarm") and the error is signalled by all three LEDs flashing simultaneously.
The mode selector switch position is taken into account on energisation.
Modifications made during operation will have no effect: the active configuration may therefore be different from that indicated by the switch, the relay operates normally but the change in configuration is signalled by all three LEDs flashing simultaneously.

**Latching**
In "memory" mode, when a fault has been recorded, the HSV relay latches in the rest position ("alarm" operational state). Once the speed is correct again, the relay can be unlatched (reset) by closing contact S2 (for 50 ms minimum).
Irrespective of the speed of the controlled process, when S2 is closed the HSV relay is inhibited, the output is at the operating point ("normal" operational state) ; if the speed is still not correct when contact S2 is reopened, the relay latches again in the rest position ("alarm" operational state).
The HSV can also be reset, by switching off and on again several times in succession (the power break must last at least 1500 ms).
If the process speed is incorrect, this method is limited by the same restriction as resetting using S2.

**HSV - Control of underspeed without latching**

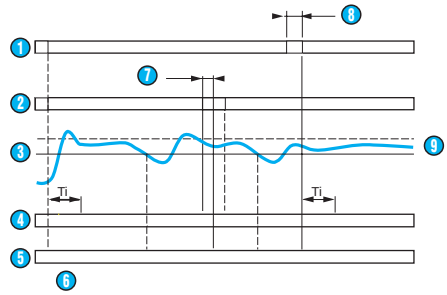



1. Voltage (S1)
2. Threshold
3. Inhibit LED
4. Relay
5. Inhibit delay on starting (Ti)
6. 1500 ms min.
7. Speed

After the end of the inhibit delay on starting, "Ti", as soon as the measured speed drops below the threshold value, the output relay changes state, from operating point to rest position ("alarm" operational state, 11-14 open and 11-12 closed).
It returns to the initial state when the speed rises above the threshold plus the hysteresis (fixed at 5% of the displayed threshold).
After the power supply returns, following a break that has lasted at least 1500 ms, the relay is in the ("normal") operating state during the time delay and stays there until the speed is above the threshold.

## Principles

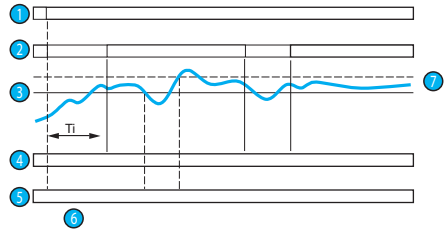
### HSV - Control of underspeed with latching




1. Voltage (S1)
2. Contact S2
3. Threshold
4. Inhibit LED
5. Relay
6. Inhibit delay on starting (Ti)
7. 50 ms min.
8. 1500 ms min.
9. Speed

When the HSV has been configured in "memory" mode, if underspeed is detected, the output relay stays in the rest state ("alarm") irrespective of any subsequent change in the speed of the process.
It will not be able to revert to ("normal") operating state until contact S2 closes (50 ms minimum).
If, when S2 reopens, the speed is inadequate, the relay reverts to the rest latched state ("alarm").
The HSV can also be reset by a power break (1500 ms minimum) ; the relay then returns to the ("normal") operating state for at least the duration of the time delay, irrespective of the speed of the process.

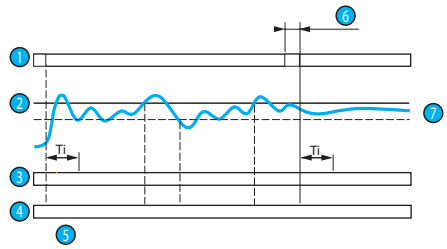
### HSV - Underspeed with inhibition by S2




1. Voltage (S1)
2. Contact S2
3. Threshold
4. Inhibit LED
5. Relay
6. Inhibit delay on starting (Ti)
7. Speed

On energisation, to allow the controlled process to reach its nominal operating speed, the HSV relay is inhibited for a period that is adjustable from 0.6 to 60 seconds.
This time delay can be modified during inhibition to be shorter or longer.
The HSV relay can also be inhibited by the closing of contact S2: on starting, for example, if the process acceleration time is more than 60 s, or at any time during operation.
Irrespective of the origin (delay on starting or S2 closing), inhibition maintains the output relay in the''closed' position'' ("normal" operational state, contacts 11-14 closed and 11-12 open) and is signalled by the Inhibit LED lighting up.
If, after removal of the inhibition (end of delay on starting or opening of contact S2), the signal detection phase has not ended, the relay drops out after the expected time between two pulses (measured from the end of inhibition).
Inhibition must last for as long as required for the product to detect at least 2 periods.
If the signal type has not been determined at the end of the inhibit period, the "inhibit" LED flashes for as long as it is impossible to measure the speed.
Similarly, during operation, it is possible to inhibit the HSV relay at any time by closing S2.

### HSV - Control of overspeed without latching

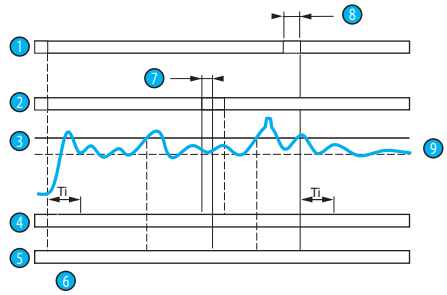



1. Voltage (S1)
2. Threshold
3. Inhibit LED
4. Relay
5. Inhibit delay on starting (Ti)
6. 1500 ms min.
7. Speed

After the end of the inhibit delay on starting, "Ti", as soon as the measured speed rises above the threshold value, the output relay changes state, from operating point to rest position ("alarm" operational state, 11-14 open and 11-12 closed).
It returns to the initial state when the speed falls back below the threshold minus the hysteresis (fixed at 5% of the displayed threshold).
After a power break that has lasted at least 1500 ms, the relay is in the ("normal") operating state during the time delay and stays there until the speed is below the threshold.

## Principles

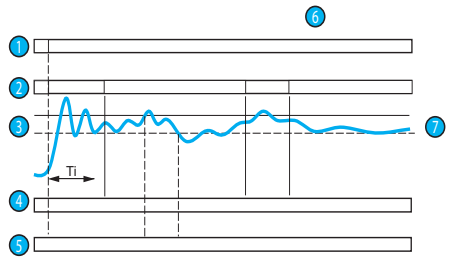
### HSV - Control of overspeed with latching




1. Voltage (S1)
2. Contact S2
3. Threshold
4. Inhibit LED
5. Relay
6. Inhibit delay on starting (Ti)
7. 50 ms min.
8. 1500 ms min.
9. Speed

When the HSV has been configured in "memory" mode, if overspeed is detected, the output relay stays in the rest state ("alarm") irrespective of any subsequent change in the speed of the process. It will not be able to revert to ("normal") operating state until contact S2 closes (50 ms minimum). If, when S2 reopens, the speed is too high, the relay reverts to the rest latched state ("alarm").
The HSV can also be reset by a power break (1500 ms minimum) ; the relay then returns to the ("normal") operating state for at least the duration of the time delay, irrespective of the speed of the process.

### HSV - Overspeed with inhibition by S2

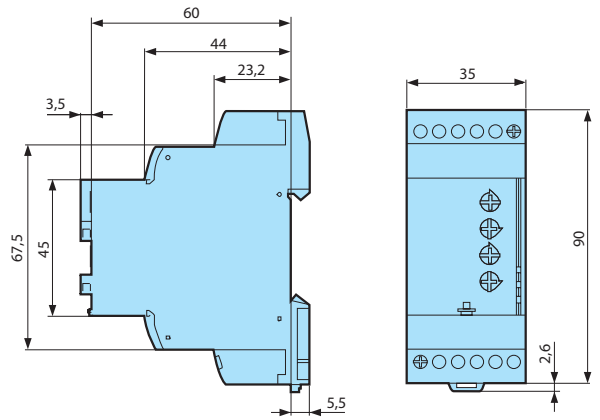



1. Voltage (S1)
2. Contact S2
3. Threshold
4. Inhibit LED
5. Relay
6. Inhibit delay on starting (Ti)
7. Speed

It is possible to inhibit the HSV relay by closing external contact S2 until the process has reached its nominal speed.

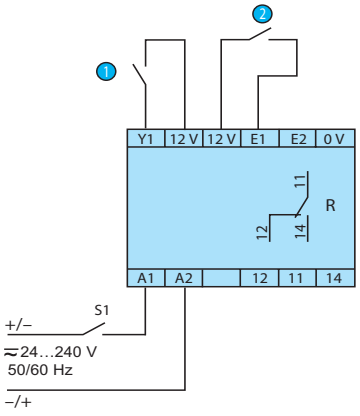
## Dimensions (mm)

**HSV**

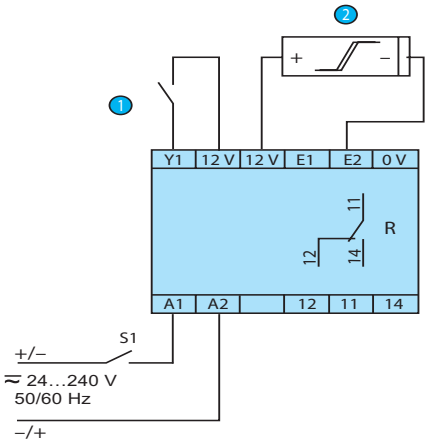



## Connections

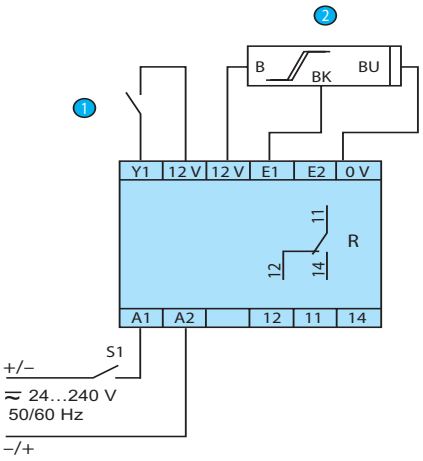
**HSV - Input circuits**



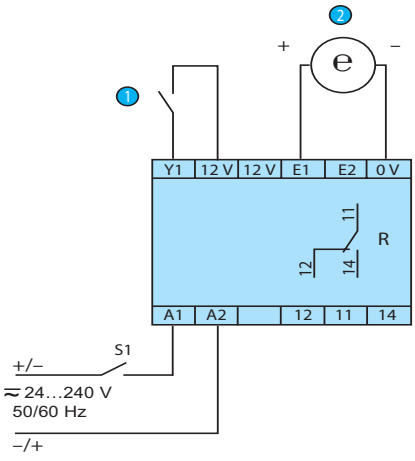

1 S2 Inhibit - Reset
2 Volt-free contact input 12 V, 9.5 kΩ




1 S2 Inhibit - Reset
2 NAMUR proximity sensor input 12 V, 1.5 kΩ




1 S2 Inhibit - Reset
2 3-wire PNP/NPN proximity switch 12 V, 50 mA max.




1 S2 Inhibit - Reset
2 Voltage input 0 V - 30 V