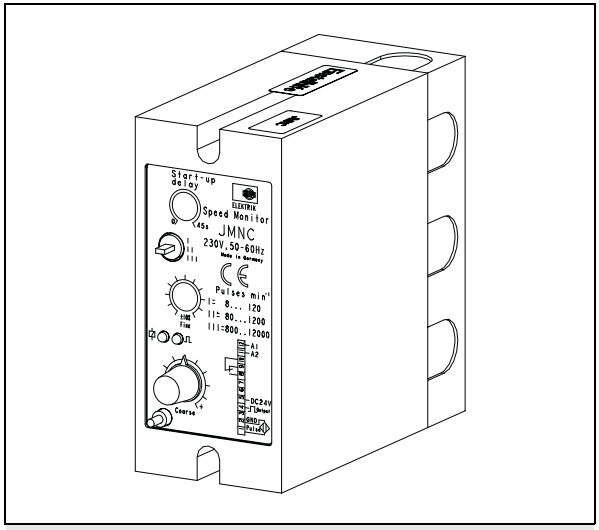



Electronic Rotational Speed Monitoring Device Type JMNC

KIEPE ELEKTRIK

Device Identification No.: 93.045 365.001/.002/.003



OPERATING INSTRUCTIONS

CE-Sign and Conformity

The device meets the requirements of the valid European and national regulations.

Conformity has been proved and the corresponding declarations and documents are deposited at the manufacturer.

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1 For your own Safety

1.1 Intended Application

The electronic rotational speed monitoring device JMNC is applied together with a pulse indicator for monitoring the rotational speed of drives.

The device is intended for use in stationary installations and in vehicles.

Applications other than specified and unauthorised modifications to the device or its components may lead to injury to persons and damage to the device for which the manufacturer is not liable.

Make sure that the intended use is not impaired in any way, even after unexpected outside influence on the device.

"Intended Application" particularly means that any work performed with the device or on the device must be carried out in accordance with the present operating instructions. Only qualified personnel that are familiar with the regulations for the prevention of accidents as well as the standard safety rules are allowed to work on the device.

Observing the intended application protects yourself and prevents damage to the device!

1.2 Symbols

Please pay particular attention to the text passages that are marked by the following symbols:



Danger!
Information that must be observed under all circumstances in order to prevent the operator from being injured.



Attention!
Information that must be observed in order to prevent damage to the device.



Helpful additional information.



2 Transport, Packing, Storage, and Disposal

2.1 Transport and Packing

Choose a suitable packing in order to prevent damage to the device during transport or when sending devices or components to Vossloh Kiepe GmbH for repair. Take great care that the device is protected against shocks and humidity. Thus, damage due to transport is prevented, for which the manufacturer is not liable.

2.2 Storage

Avoid significant variations in temperature that may cause the formation of condensation water, as this might damage the device.

The permissible storage temperature is between -35°C to +80°C.



Attention!
Keep the device clean and dry.

2.3 Disposal

If possible, reuse the packing material or dispose of it in an environmentally friendly way.

Send defective devices and components to Vossloh Kiepe GmbH for correct recycling or disposal *(company address see back cover)*.

3 Design and Function

The electronic rotational speed monitoring device JMNC is applied together with a pulse indicator for monitoring and controlling drives. The pulses of the indicator are analysed by the speed monitoring device which signals the overspeeding or underspeeding of a nominal rotational speed.

3.1 Design

The electronic rotational speed monitoring device JMNC is equipped into a solid plastic housing (**8**), which can be mounted onto an operating panel by means of screws. All indicating and operating elements are assigned to the front side of the device *(s. fig. 3-1)*.

Potentiometer start-up delay (1), "run-up bridging"

This potentiometer serves to set the duration of the run-up bridging in between 0 and approx. 45 seconds.

Pulse selection switch (2)

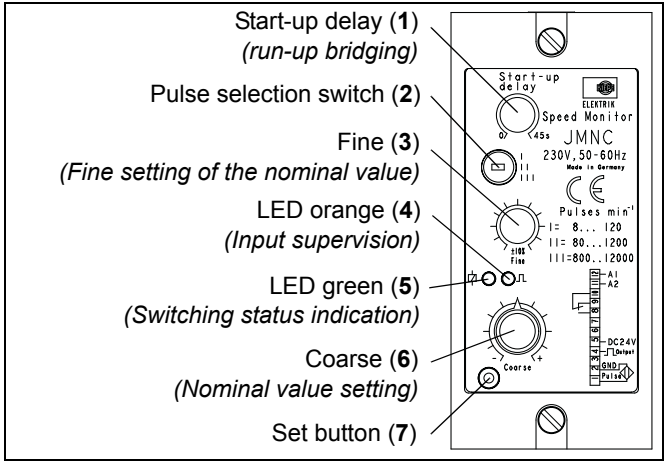


Fig. 3-1: Operating elements of the monitoring device

Set the required range of pulses by means of this switch.

Switch position / Range of pulses		
I	8 to 120	pulses/minute
II	80 to 1200	pulses/minute
III	800 to 12000	pulses/minute

Fine (3), fine setting of the nominal value

The setting of the nominal value can be readjusted by ± 10%. Thereby, the switching point of the output relay can be changed about 10% of the set rotational speed.

LED orange (4), input supervision

This light-emitting diode flashes with the cycle of the indicator pulses. When the pulses increase 1500/minute, the diode lights continually.

LED status, orange	
Flashing:	Pulses of the rotational speed indicator are applied.
Permanently:	Number of pulses > 1500/minute
Off:	Malfunction (e. g. pulse indicator or connection line defective).

LED green (5), switching status of the relay

By means of this light-emitting diode the switching status of the rotational speed monitoring device can be checked.

LED status, green	
On:	output relay (**16**) attracted
Off:	output relay (**16**) dropped

Coarse (6), nominal value setting

By means of this potentiometer the rotational speed monitoring devices can be aligned to the operating speed of the drive.

Set button (7)

By pressing the red button the output relay (**16**) can be controlled directly and will not drop during the setting.

3.2 Function Principle of the JMNC

3.2.1 General

In connection with a rotational speed indicator, the rotational speed monitoring device JMNC is used to monitor drives for underspeed, standstill, or overspeed.

The pulses of the rotational speed indicator are analysed by the monitoring device, which signals the underspeeding or overspeeding of a set nominal rotational speed.

The indicator input (**17**) (terminals 1/2) of the rotational speed monitoring device is designed for rotational speed indicators complying with the npn and Namur regulations. The indicator input (**17**) can be monitored by means of the light-emitting diode LED orange (**4**).

Any number of monitoring devices JMNC can be connected to one pulse indicator.

The output relay (**16**) of the rotational speed monitoring device is a change-over contact. The current switching status of the relay is indicated by the light-emitting diode LED green (**5**).

Type	Number/switch-over contact
JMNC	1 x change-over contact (open contact/closed contact)

In addition, the rotational speed monitoring device JMNC is provided with a pulse output to connect common digital rotational speed counters *(see section 5.3.1, Connection Assignment)*.

3.2.2 Run-up Bridging

In order to start up the plant, the rotational speed monitoring device JMNC is provided with the feature run-up bridging.

By means of the potentiometer start-up delay (**1**) the period of the run-up bridging can be set in between 0 and 45 seconds. During this time, the output relay (**16**) remains attracted, and the plant can be started.

3.2.3 Underspeed Monitoring/Switching Function (with run-up bridging)

During the set run-up bridging period the output relay (**16**) is attracted *(see also fig. 5-4)*.

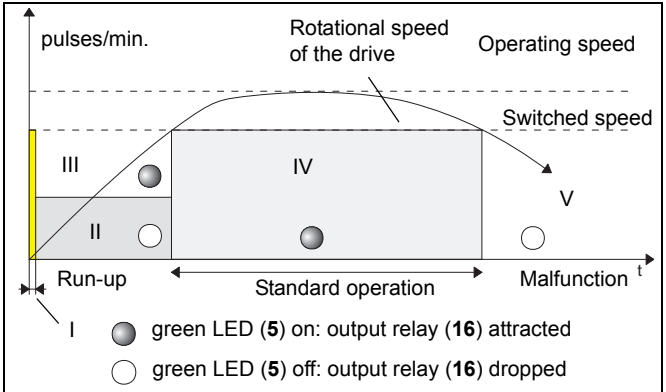
Rotational speed monitoring device	the following relay contacts are closed
JMNC	8 and 10

After expiration of the run-up bridging period, and when the drive operates with a constant rotational speed, the output relay (**16**) remains attracted and the green LED (**5**) lights. The orange LED (**4**) flashes in the cycle of the incoming pulses.

Underspeeding of the nominal rotational speed

If the set rotational speed is not reached, the output relay (**16**) drops and the green LED (**5**) extinguishes *(see also fig. 5-4)*.

Rotational speed monitoring device	the following relay contacts are closed
JMNC	9 and 10



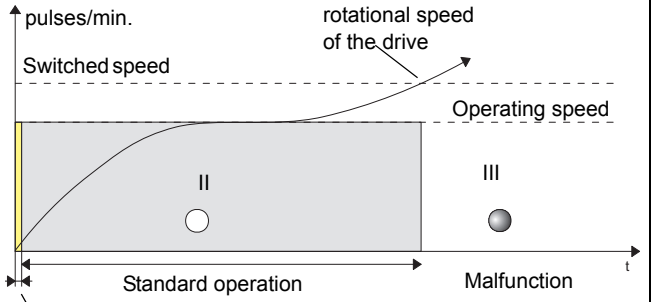
Item	Description	Contact closed	green LED
		JMNC	
I	relay triggering time, t = 200 ms	9 -10	○
II	without run-up bridging	9 -10	○
III	with run-up bridging	8 -10	●
IV	number of pulses above nominal value	8 -10	●
V	number of pulses below nominal value	9 -10	○

Fig. 3-2: Time table for underspeed counter

3.2.4 Overspeed Monitoring (without Run-up Bridging)

When overspeeding the set rotational speed the output relay is attracted and the green LED (**5**) lights *(see also fig. 5-5)*

Rotational speed monitoring device	the following relay contacts are closed
JMNC	8 and 10



Item	Description	Contact closed	green LED
		JMNC	
I	relay triggering time t = 200 ms	9 -10	○
II	number of pulses below nominal value	9 -10	○
III	number of pulses above nominal value	8 -10	●

Fig. 3-3: Time table for overspeed counter



4 Technical Data

4.1 Safety Regulations

VDE 0100	Regulation for mounting power plants with nominal voltages up to 1,000 V
VDE 0113 part 1 (DIN EN 60204)	Machines' safety; Electrical equipment of machine
VDE 0113 part 101 (DIN EN 60204)	Machines' safety; Display, indication, operation
VDE 0160 (DIN EN 50178)	Equipment of power plants with electronic materials
Regulations for the prevention of accidents	particularly VBG 4

EN regulations, national standards, directions of the operating authority

4.2 Supply Voltage

Terminals 11, 12	Power consumption	JMNC type
AC 230 V ± 10%, 50 - 60 Hz	< 3.5 VA	93.045 365.001
AC 115 V ± 10%, 50 - 60 Hz	< 3.5 VA	93.045 365.003
DC 24 V ± 20%	< 2.5 W	93.045 365.002

4.3 Reference Data

Accuracy of switching point	± 5 % of the nominal speed value
Run-up bridging	0 to ~ 45 s (adjustable)
Switching hysteresis	> 5%

4.4 Input Data

Indicator input/pulse input	Terminals 1, 2
Indicator type	all 2-wire pulse indicators according to NAMUR (EN 50227), e. g. Kiepe type DG or DK or 3-wire pulse indicator (npn), z. B. Kiepe type EOG.
Min. pulse duration of the indicator	≥ 1.5 ms

Pulse ranges (adjustable)	pulses/minute	switch-off delay in s (excl. relay dropping time)
I	8 … 120	7.5 … 0.5
II	80 … 1200	0.75 … 0.05
III	800 … 12000	0.075 … 0.005

4.5 Output Data

Relay output	Terminals 8,9,10
Type of contact	1 change-over contact
Max. switching voltage (AC/DC)	250 V (AC) / 250 V (DC)
Max. switching current (AC/DC)	5 A (AC) / 1 A (DC)
Max. switching capacity (AC/DC)	1000 VA (AC) / 30 W (DC)
Triggering time of the relay	200 ms (after applying supply voltage)
Pulse output	**Terminal 4**
I_L	≤ 1 mA
DC output	**Terminal 5**
Output voltage	24 V (DC)

4.6 Environment

Permissible operating temperature	- 25 °C to + 70 °C
Permissible storage temperature	- 35 °C to + 80 °C

4.7 Design

Protection class	IP 40 according to DIN VDE 0470, part 1 (EN 60529) (when using the setting tools)
Protection class of ISO housing	IP 57 according to DIN VDE 0470, part 1 (EN 60529)
Line cross section	max. 2.5 mm^2
Dimensions (w x h x d)	52 mm x 120 mm x 113 mm (+ 8 mm for the setting tools (**22**) or the set button (**7**))
Fastening	Mounting by means of screwing (e. g. onto operating panels) or in ISO housing (punched mounting bores in the bottom of the housing available)
Built-in position	any
Weight	approx. 370 g: 93.045 365.001, 93.045 365.003 approx. 270 g: 93.045 365.002

4.8 JMNC Dimensions

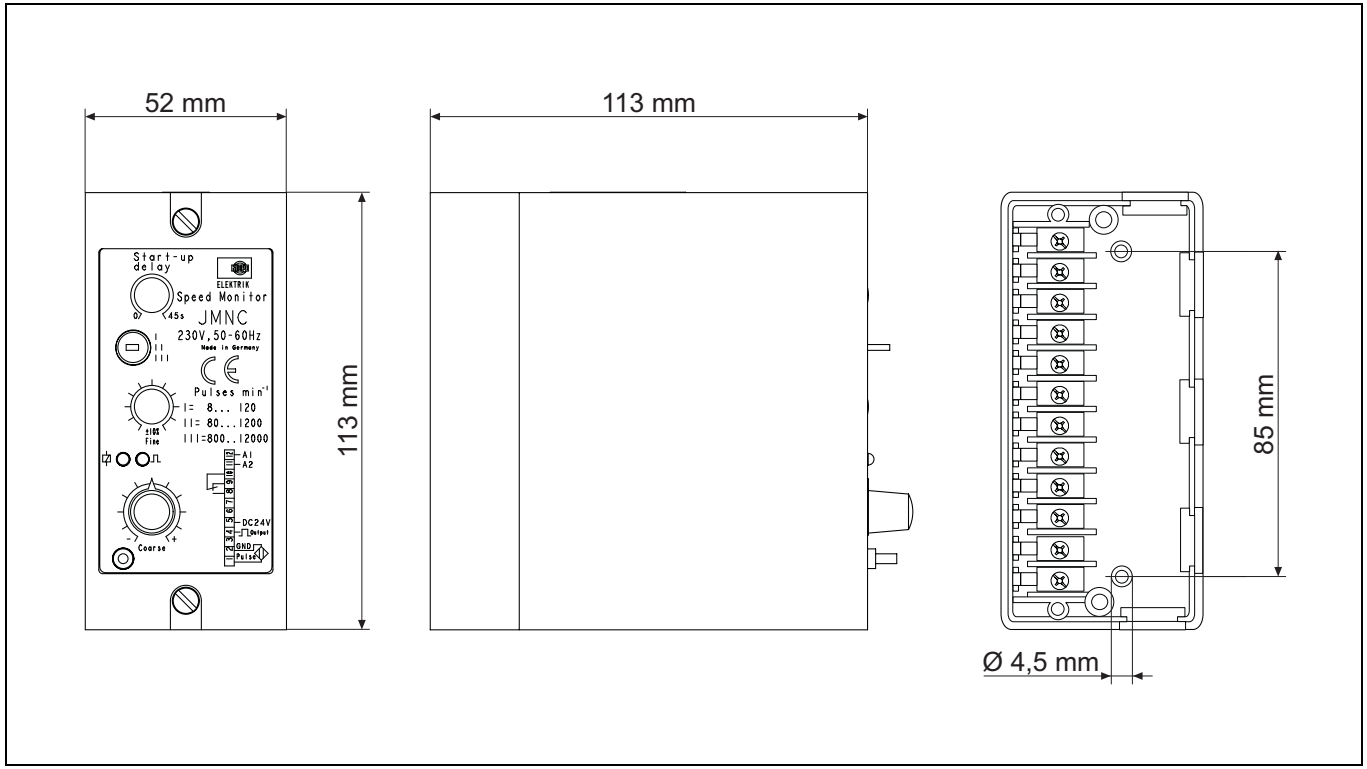


Fig. 4-1: JMNC, built-in dimensions

4.9 Built-in Dimensions ISO Housing

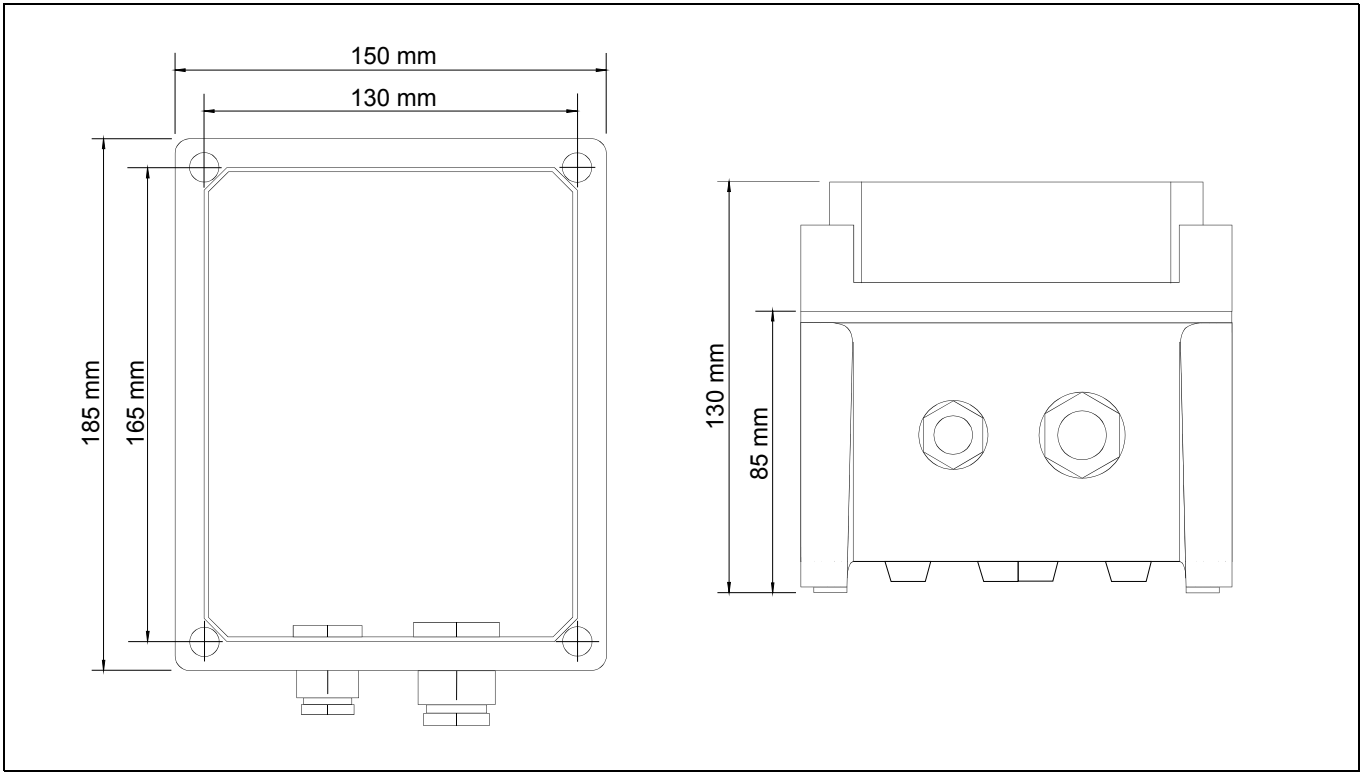


Fig. 4-2: Built-in dimensions ISO housing

5 Mounting and Dismounting

5.1 Scope of Delivery

The rotational speed monitoring device JMNC is delivered ready for operation. For setting the potentiometer the delivery includes two setting tools (**22**) made of plastic *(s. fig. 5-1)*. Fastening screws etc. are not included in our scope of delivery. On request, the speed monitoring device can be delivered completely wired into an ISO plastic housing (incl. transparent hood).

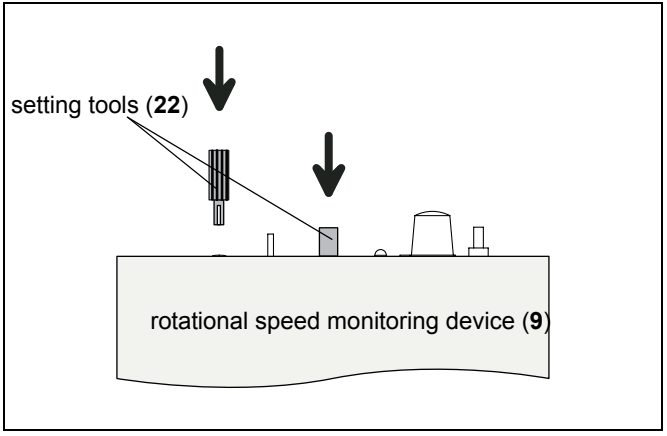


Fig. 5-1: Setting tools

5.2 Mounting

Danger electric shocks!

The mounting and the electrical connection may only be carried out by qualified electricians.

Before mounting, disconnect the plant and prevent it from being switched on again. Cover live parts in the vicinity to prevent any contact.

Attention!

Choose the mounting location and the built-in position in such a way that the device can be securely operated.

1. Before mounting, disconnect the plant and prevent it from being switched on again.
2. Loosen the two screws (**12**) on both sides of the rotational speed monitoring device (**9**) *(s. fig. 5-2)*.
3. Pull the rotational speed monitoring device (**9**) off the base (**10**).

Attention!

We recommend you to pull the rotational speed monitoring device (9) straight off the base (10), because the plug contacts (11) could break off.

4. Drill the punched mounting bores (**13**) in the base bottom by means of a 4.5 mm driller (*see fig. 4-1)*.
5. Drill the fastening holes, and tightly fasten the base (**10**) by means of two suitable M4 screws.
6. Make the electrical connection *(see section 5.3)*.
7. After the electrical connection, plug the rotational speed monitoring device (**9**) back onto the base (**10**) and fasten the screws.

Attention

Make sure that the rotational speed monitoring device (9) is plugged in the correct position!
Take care that the plug contacts (11) are plugged into the terminal strip of the base.

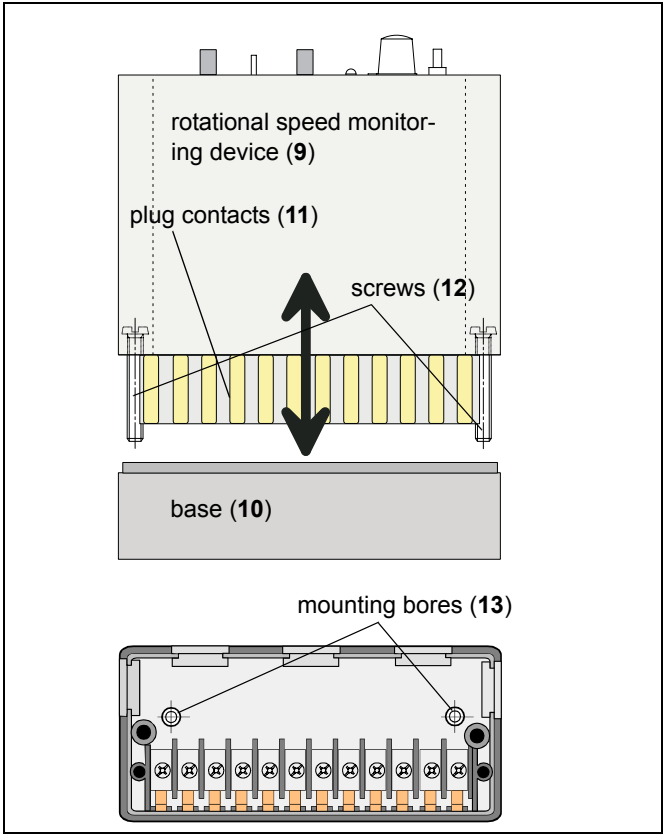


Fig. 5-2: Mounting to rotational speed monitoring device

5.3 Electrical Connection

Danger of electric shocks!

The mounting and the electrical connection may only be realised by qualified electricians.

Before making the electrical connection, disconnect the plant and prevent it from being switched on again. Cover live parts in the vicinity to prevent any contact.

Install all connection cables in such a way that they are not damaged or torn off the device.

Attention!

An operation with incorrect supply voltage may damage the device.

Prior to the electrical connection check whether the data indicated on the label comply with the supply voltage of your plant

When connecting the pulse indicators observe the correct polarity.

Only use screened cables for the control lines in order to prevent interferences.

1. Before making the electrical connection, disconnect the plant and prevent it from being switched on again.
2. Make sure that the plant is voltage-free.
3. Install the connection cables and guide them into the cable inlets of the base (**10**) *(s. fig. 5-3)*.

We recommend you to install the control lines and the power supply line separately.

4. Make the electrical connection according to the below indicated connection diagrams *(see section 5.3.1)*.

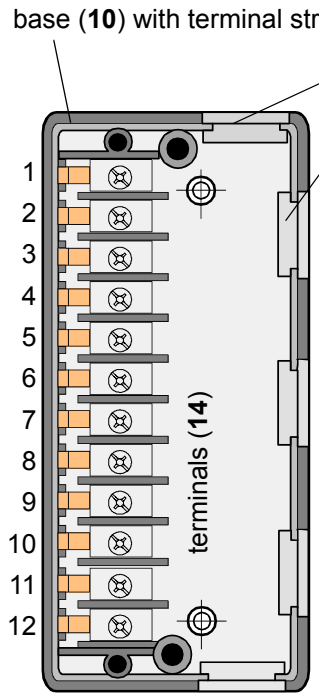
Inside the ISO plastic housing, the electrical connections from the rotational speed monitoring device are installed onto an external terminal strip, however, the connection assignment is identical to the below indicated.

5. Plug the rotational speed monitoring device (**9**) back onto the base base (**10**) *(s. fig. 5-2)*.

Attention!

Make sure that the rotational speed monitoring device (9) is plugged onto the base (10) in the correct position.

5.3.1 Connection Assignment



Terminal	JMNC
1	Pulse, indicator input (plus) (NAMUR)
2	GND, indicator input (minus)
3	not assigned
4	Pulse output
5	24 V DC, output
6	not assigned
7	not assigned
8	Relay contact closed
9	Relay contact open
10	Relay contact
11 12	Supply voltage: 230 V (AC) / 115 V (AC) or 24 V (DC)

Fig. 5-3: Connection assignment

5.3.2 Connection Samples

Underspeed monitoring device, with or without run-up bridging (JMNC)

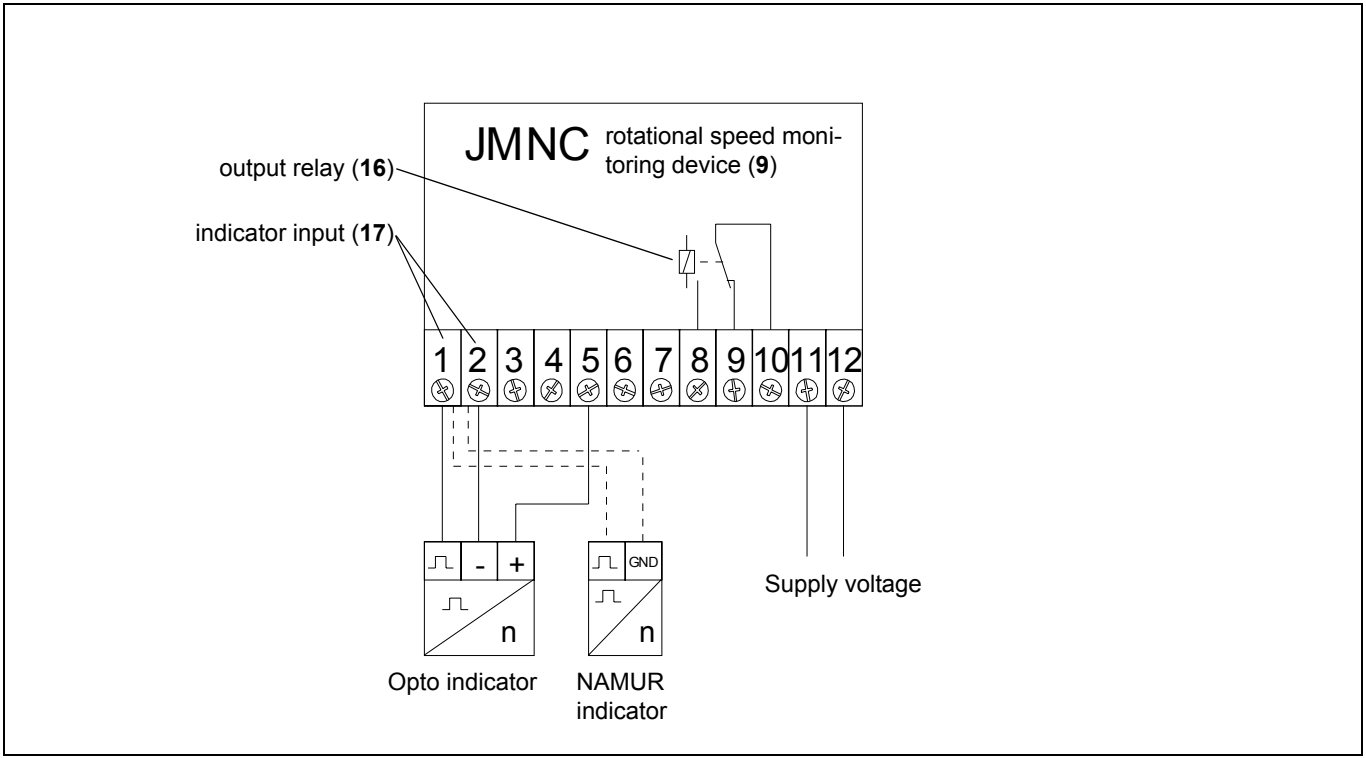


Fig. 5-4: Example: underspeed monitoring device, with or without run-up bridging, also valid for standstill monitoring devices (without run-up bridging)

Several rotational speed monitoring devices JMNC connected to one pulse indicator

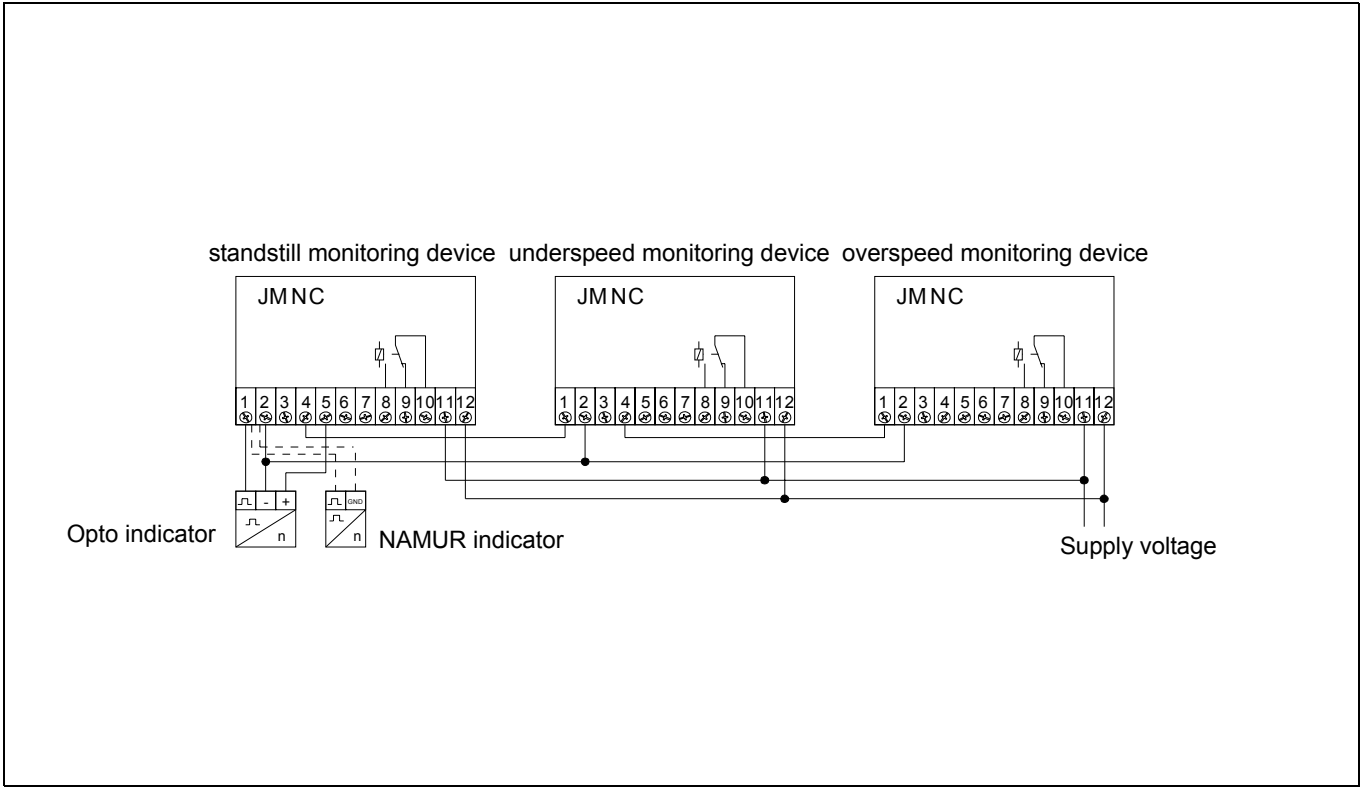


Fig. 5-5: Example: Several rotational speed monitoring devices JMNC connected to one pulse indicator

5.4 Dismounting the Rotational Speed Monitoring Device

Danger of electric shocks!

Mounting and electrical connection may only be carried out by qualified electricians.

Before making the electrical connection, disconnect the plant and prevent it from being switched on again.

Cover live parts in the vicinity to prevent any contact.

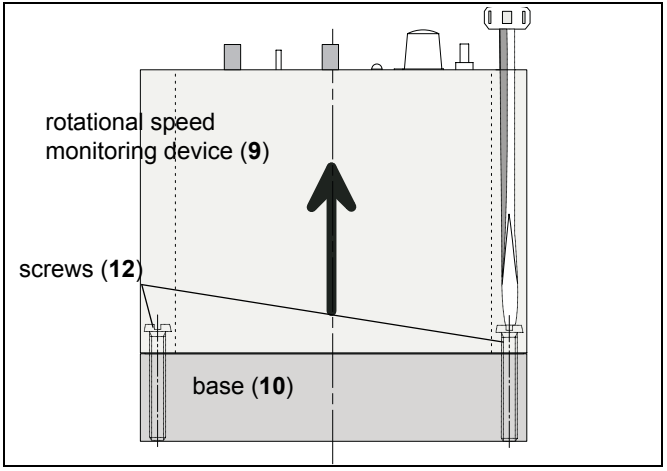


Fig. 5-6: Dismounting

1. Before dismounting the device, disconnect the plant and prevent it from being switched on again.
2. Make sure that the plant is free of any voltage.
3. Loosen the two screws (**12**) on both sides of the rotational speed monitoring device (**9**) *(s. fig. 5-6)*.
4. Slowly pull the rotational speed monitoring device (**9**) off the base (**10**).

Attention!

We recommend you to pull the rotational speed monitoring device (9) straight off the base (10), because the plug contacts (11) could break off.

5. Loosen the cores of the terminals (**14**) *(s. fig. 5-3)*.
6. Loosen both fastening screws and remove the device.
7. Plug the rotational speed monitoring device (**9**) back onto the base (**10**) and fasten the screws.

Attention!

Make sure that the rotational speed monitoring device (9) is plugged in the correct position!

Take care that the plug contacts (11) are plugged into the terminal strip of the base (10).

6 Setting the Rotational Speed Monitoring Device JMNC

Attention!
Only switch on the rotational speed monitoring device together with the drive.

Only set the device with corresponding operating temperature in order to reach the highest accuracy when setting the switching point.

When using the included setting tools (**22**) they are latched and hard to pull off again. We therefore recommend you to leave the setting tools (**22**) in order to prevent maladjustment of the potentiometers when pulling the tools off.

It is also possible to use a screw driver with an insulated shoe.

6.1 Before Setting the Device

The potentiometers start-up delay (**1**) and Fine (**3**) are covered with plastic caps to protect them from contamination *(s. fig. 3-1)*.

1. Remove the plastic caps from the potentiometers start-up delay (**1**) and Fine (**3**).
2. Carefully plug the two setting tools (**22**) onto the potentiometers.

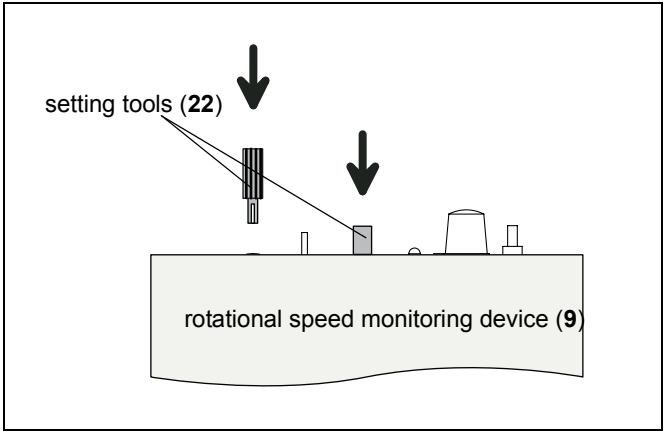


Fig. 6-1: Using the setting tools

6.2 Setting the Underspeed with Run-up Bridging

6.2.1 Basic Settings

Item	Description		Indication/Action
1		Turn the potentiometer Fine (**3**) to the right side up to the stroke.	
2		Turn the potentiometer Coarse (**6**) to the right side up to the stroke.	
3		Set the pulse selection switch (**2**) into position III (800 … 12000 pulses/minute).	

6.2.2 Setting the Run-up Bridging Period (Start-up delay)

We recommend you to use a stop-watch for the setting.

Item	Description		Indication/Action
1		Set the potentiometer start-up delay (**1**) to the required run-up period in between 0 and 45 seconds.	
2	 Start	Switch on the power supply and measure the time by means of a stop-watch.	The output relay (**16**) is attracted. The green LED (**5**) lights. The orange LED (**4**) flashes in the cycles of the pulse indicator.

Item	Description		Indication/Action
		After expiration of the set run-up time, the rotational monitoring device detects "underspeed", because the switching threshold was set to its maximum value *(see section 6.2.1, page 26)*.	The green LED (**5**) extinguishes.
3	 Stop	Measure the time, and switch off the voltage supply.	The output relay (**16**) drops. The LEDs are off.
4		Compare the measured time with the set time for the start-up delay.	
5		For higher discrepancies repeat the settings 1 to 4.	

6.2.3 Setting the Switch Point for Underspeed Monitoring

Always select the higher pulse range, when the required switch-off point is in the overlapping area of the pulse selection switch (**2**) (example: required switch-off point = 100 pulses/min., set the pulse selection switch (**2**) into position II).

Note that the rotational speed monitoring device processes pulses per minute and not rotations per minute. You therefore have to multiply the rotational speed of the drive by the indicated number of pulses per rotation.

Item	Description		Indication/Action
1		Set the pulse selection switch (**2**) to the required pulse range.	
2		Press the red set button (**7**) and keep it pressed during all following settings.	This is to bridge the switch point of the output relay (**16**) during the setting.
3		Switch on the rotational speed monitoring device and the drive.	The output relay (**16**) is attracted and the plant starts up. The green LED (**5**) lights. The orange LED (**4**) flashes on arrival of the indicator's pulses.
4		After expiration of the set run-up bridging time…	… the green LED (**5**) extinguishes.

Item	Description		Indication/Action
5		Setting the nominal value of the switch point Very slowly turn the potentiometer Coarse (**6**) (nominal value setting) counter-clockwise, until…	… the green LED (**5**) lights. Now the switch point is roughly adjusted to the operating rotational speed.
		Observe the pulse intervals The switch points cannot be set during the pulse intermissions.	When the pulse selection switch (**2**) was set to position I (8 … 120 Imp./min.), long pulse intermissions can be caused by low speeds, e. g. 7.5 s at 120 pulses/min.
6		Slowly turn the potentiometer Coarse (**6**) clockwise, until …	… the green LED (**5**) extinguishes.
7		Precise setting of the switch point Slowly turn the potentiometer Fine (**3**) counter-clockwise, until …	… the green LED (**5**) lights. If the green LED (**5**) does not light, though the potentiometer Fine (**3**) was turned up to the stroke, turn the potentiometer Fine (**3**) completely back, and repeat the setting, starting with item 5. The switch point of the output relay (**16**) is now set precisely to the operating speed. For devices without activated run-up bridging, the output relay (**16**) is attracted when the drive reaches this rotational speed.
8		Switch-off point at 10% underspeed Due to the switching hysteresis, the switch-off point is approx. 10% lower than the switch-on point,	i. e. when the operating rotational speed is reduced about 10%, the output relay (**16**) drops.

Item	Description		Indication/Action
9		If you did not realise the switch-on speed by the precise setting, repeat the settings, item 1-7. For this, turn the potentiometers Fine (**3**) and Coarse (**6**) completely back (clock-wise).	Perhaps the switch point was not fixed by the potentiometer Coarse (**6**) (nominal value).
10		Switch off the voltage supply and release the red set button (**7**).	
11		Carry out a final check by testing the set switch points.	

6.2.4 Underspeed Monitoring, Increasing the Switch Point Delay

The switching hysteresis (switch point delay) of the rotational speed monitoring device comes up to 10% of the set switch point.

By means of the potentiometer Fine (**3**) the switch-on and switch-off points can be reduced in 2%-increments, thus selecting a lower rotational speed than the switch-off point. The hysteresis between switch-on ad switch-off point remains unchanged at 10%.

Item	Description		Indication/Action
1-8		Set the device according to section 6.2.3.	
9		Slowly turn the potentiometer Fine (**3**) counter-clockwise.	The switch-on and the switch-off point are lowered by approx. 2% per increment.
10		Complete the setting according to *item 10, section 6.2.3.*	

6.3 Setting the Overspeed Monitoring (without Run-up Bridging)

6.3.1 Basic Setting

Attention!
Do not press the red set button (7).

This section provides that the rotational speed monitoring device (**9**) is already connected to a plant. In this case you must make sure that during the following settings the drive is not switched off by the output relay (**16**).



Danger of electric shocks!
The mounting and the electrical connection may only be realised by a qualified electrician.

Before starting the setting, disconnect the plant and prevent it from being switched on again.

Cover live parts in the vicinity to prevent any contact.

Item	Description		Indication/Action
1		Disconnect the plant and prevent it from being switched on again.	
2		Make sure that the plant is free from any voltage.	
3		Pull the rotational speed monitoring device (**9**) off the base (**10**).	
4		Bridge the relay contacts … JMNC Bridge terminals 9 and 10. JMND Bridge terminals 5 and 7 / 9 and 10.	… in order to avoid that the plant switches off during the setting.
5		Plug the rotational speed monitoring device (**9**) back onto the base (**10**).	
6		Set the pulse selection switch (**2**) to the required pulse range.	
7		Turn the potentiometer Coarse (**6**) counter-clock-wise up to the stroke.	
8		Turn the potentiometer Fine (**3**) counter-clock-wise up to the stroke.	

6.3.2 Setting the Switch Point for Overspeed



Danger of electric shocks!

The mounting and the electrical connection may only be carried out by qualified electricians.

Before starting the setting, disconnect the plant and prevent it from being switched on again.

Cover live parts in the vicinity to prevent any contact.

Item	Description		Indication/Reaction
1		Switch on the supply voltage and the drive.	The output relay (**16**) is attracted. The green LED (**5**) lights. The orange LED (**4**) flashes in the cycle of the incoming pulses.
2		Slowly turn the potentiometer Coarse (**6**) (nominal value setting) clockwise, until …	… the green LED (**5**) extinguishes. The output relay (**16**) dropped.
3		Slowly turn the potentiometer Coarse (**6**) counter-clockwise, until …	… the green LED (**5**) lights again. The switch point of the output relay (**16**) is now adjusted to the operating rotational speed.
4		Slowly turn the potentiometer Fine (**3**) clockwise, until…	…the green LED (**5**) extinguishes. The switch-off point is now 10% above the operating rotational speed.
5		Switch off the voltage supply and the drive and prevent them from being switched on again.	
6		Make sure that the plant is free of any voltage.	

Item	Description	Indication/Reaction
7	Pull the rotational speed monitoring device (**9**) off the base (**10**).	
8	Remove the bridges from the relay contacts.	
9	Plug the rotational speed monitoring device (**9**) back onto the base (**10**) and fasten the screws.	
10	Carry out a final check of your settings.	



7 Maintenance and Repair

The electronic rotational speed monitoring devices JMNC are maintenance-free.

Defective devices can be sent for repair directly to Voss-loh Kiepe GmbH *(company address see back cover)*.



8 Ordering Devices

With each purchase order please quote the type of the rotational speed monitoring device and the device identification number *(company address see back cover)*:

Electronic rotational speed monitoring device Type	Device identification number	Supply voltage
JMNC	93.045 365.001	AC 230 V
	93.045 365.003	AC 115 V
	93.045 365.002	DC 24 V

Modification-Index: G
Edition: 04.09.2006
Doc.-Ident-No.: 94.054 963.191

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