Operating Manual

DZ260, 261, 266, 267, 269
Monitor for speed, standstill and direction of rotation with incremental encoder signals

Product features:

- Compact and most versatile monitor series for control of overspeed, underspeed, standstill and direction of rotation
- Logical monitoring of remote motion enable signals
- Universal inputs for connection to incremental encoders (TTL, RS422 or HTL), proximity switches, photocells remote TTL signals
- Extremely wide frequency range, operating from 0.1 Hz up to 1 MHz
- Easy setup by means of four keys and LCD menu
- All models include serial RS232 interface

Available devices:

DZ260: Monitor with 3 programmable output relays and 1 analog output

DZ261: Monitor with 3 fast switching transistor outputs and 1 analog output

DZ266: Monitor with 1 analog output only

DZ267: Monitor with 3 programmable output relays only

DZ269: Monitor with 3 fast switching transistor outputs only

Version:	Description:
DZ26001b_af/kk/hk_07/07	First edition in English
DZ26002a_af/kk/hk_01/08	Commands "Force Relays" and "Freeze Relays" added
DZ26003a_af/hk_11/08	Command Monitor for remote enable signal
DZ26003b_pp_11/11	Chapter 6.2.2 "Encoder properties" replaced TTL by HTL
DZ26003c_pp_07/12	Hint: "Special Menu" is password protected (Chap. 6.2.5)
DZ26003d_pp_11/12	Changed "Setting Range" for parameter "Wait Time" (code A3)
DZ26004a_sn_12/12	Additional device DZ261 and DZ269
DZ26004b_hk/nw_04/13	Small corrections
DZ26004c_sn_06/14	Small corrections Analog-Menu
Dz26004d/ag_04/15	Small corrections Analog-Menu. New chapter 1. "Safety Instructions and Responsibility".
Dz260_04e_ag / Aug-15	- Analog output 4.13 – hint: only V or mA can be used (not both together) - Analog menu 7.2.7 – some hints and a setup example supplemented - Some smaller corrections and modulations
Dz260_05a_af / Okt-16	Parameter Analogue ABS added Parameter Preselection Mode increased to 9

Table of Contents

1. Safety Instructions and Responsibility

1.1. General Safety Instructions

This operation manual is a significant component of the unit and includes important rules and hints about the installation, function and usage. Non-observance can result in damage and/or impairment of the functions to the unit or the machine or even in injury to persons using the equipment!

Please read the following instructions carefully before operating the device and observe all safety and warning instructions! Keep the manual for later use.

A pertinent qualification of the respective staff is a fundamental requirement in order to use these manual. The unit must be installed, connected and put into operation by a qualified electrician.

Liability exclusion: The manufacturer is not liable for personal injury and/or damage to property and for consequential damage, due to incorrect handling, installation and operation. Further claims due to errors in the operation manual as well as misinterpretations are excluded from liability.

In addition the manufacturer reserve the right to modify the hardware, software or operation manual at any time and without prior notice. Therefore, there might be minor differences between the unit and the descriptions in operation manual.

The raiser respectively positioner is exclusively responsible for the safety of the system and equipment where the unit will be integrated.

During installation or maintenance all general and also all country- and application-specific safety rules and standards must be observed.

If the device is used in processes, where a failure or faulty operation could damage the system or injure persons, appropriate precautions to avoid such consequences must be taken.

1.2. Use according to the intended purpose

The unit is intended exclusively for use in industrial machines, constructions and systems. Non-conforming usage does not correspond to the provisions and lies within the sole responsibility of the user. The manufacturer is not liable for damages which has arisen through unsuitable and improper use.

Please note that device may only be installed in proper form and used in a technically perfect condition and in accordance to the Technical Specifications (see chapter 11).

The device is not suitable for operation in explosion-proof areas or areas which are excluded by the EN 61010-1 standard.

1.3. Installation

The device is only allowed to be installed and operated within the permissible temperature range. Please ensure an adequate ventilation and avoid all direct contact between the device and hot or aggressive gases and liquids.

Before installation or maintenance, the unit must be disconnected from all voltage-sources. Further it must be ensured that no danger can arise by touching the disconnected voltage-sources.

Devices which are supplied by AC-voltages, must be connected exclusively by switches, respectively circuit-breakers with the low voltage network. The switch or circuit-breaker must be placed as near as possible to the device and further indicated as separator.

Incoming as well as outgoing wires and wires for extra low voltages (ELV) must be separated from dangerous electrical cables (SELV circuits) by using a double resp. increased isolation.

All selected wires and isolations must be conform to the provided voltage- and temperature-ranges. Further all country- and application-specific standards, which are relevant for structure, form and quality of the wires, must be ensured. Instructions about the permissible wire cross-sections for wiring are described in the chapter 11 "Technical Specifications".

Before first start-up it must be ensured that all connections and wires are firmly seated and secured in the screw terminals. All (inclusively unused) terminals must be fastened by turning the relevant screws clockwise up to the stop.

Overvoltages at the connections must be limited to values in accordance to the overvoltage category ll.

For placement, wiring, environmental conditions, as well as shielding and earthing/grounding of the supply lines, the general standards of industrial automation industry and the specific shielding instructions of the manufacturer are valid. Please find all respective hints and rules on www.motrona.com/download.html --> "[General EMC Rules for Wiring, Screening and Earthing]".

1.4. Cleaning, Maintenance and Service Notes

To clean the front of the unit please use only a slightly damp (not wet!), soft cloth. For the rear no cleaning is necessary. For an unscheduled, individual cleaning of the rear the maintenance staff or assembler is self-responsible.

During normal operation no maintenance is necessary. In case of unexpected problems, failures or malfunctions the device must be shipped back to the manufacturer for checking, adjustment and reparation (if necessary). Unauthorized opening and repairing can have negative effects or failures to the protection-measures of the unit.

2. Introduction

This new series of monitors has been designed as control modules for mounting inside of electric control cabinets. The units are suitable for speed monitoring of machines, signalling overspeed, underspeed, zero motion and the direction of rotation. Units providing an analog output can moreover be used for closed-loop control or feedback purpose within a control system.

Very special advantages of these new monitors are the wide frequency range, the extremely fast response and the remarkable versatility with regard to possible input formats and programmable monitoring functions.

3. Available Models

There are five models available, all with fully similar basic functions, but with different options concerning the outputs.

DZ 260

DZ = Function: Speed Monitor

26 = Housing with dimensions 72 x 91 mm
    (2.835 x 3.583 ''), with LCD and keypad

0 = Analogue output + 3 relay outputs
1 = Anlaouge output + 3 transistor outputs
6 = Analogue output only
7 = Relay outputs only
9 = Transistor outputs only
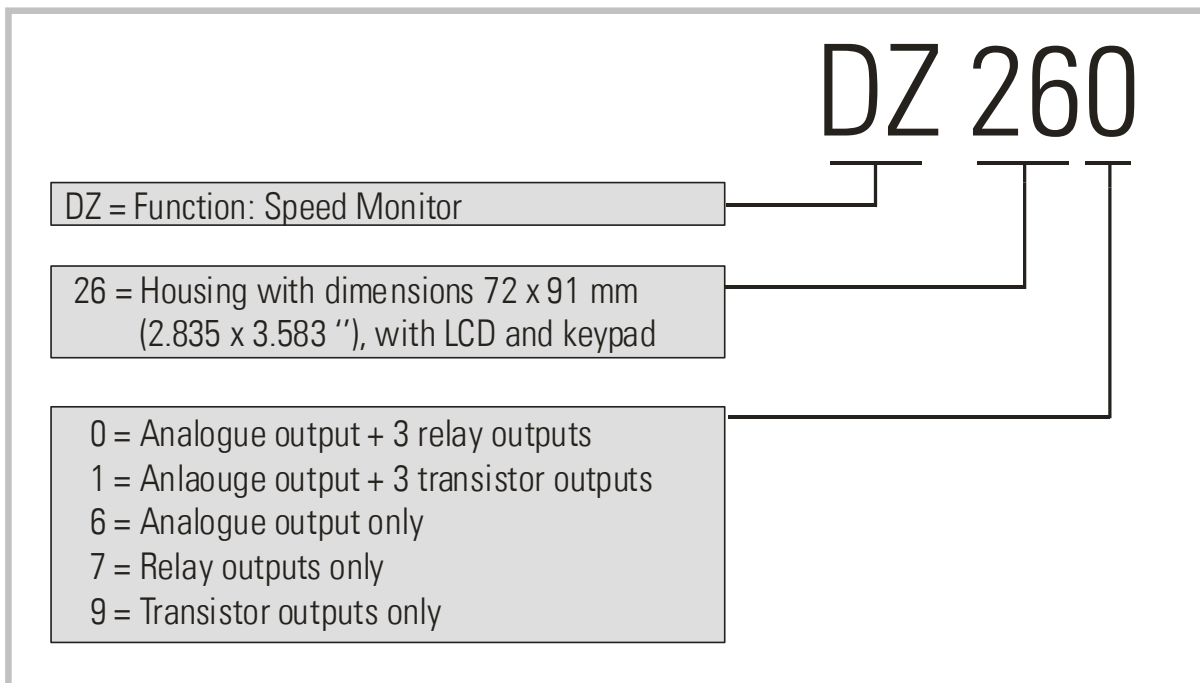
4. Electrical Connections

4.1. DZ260

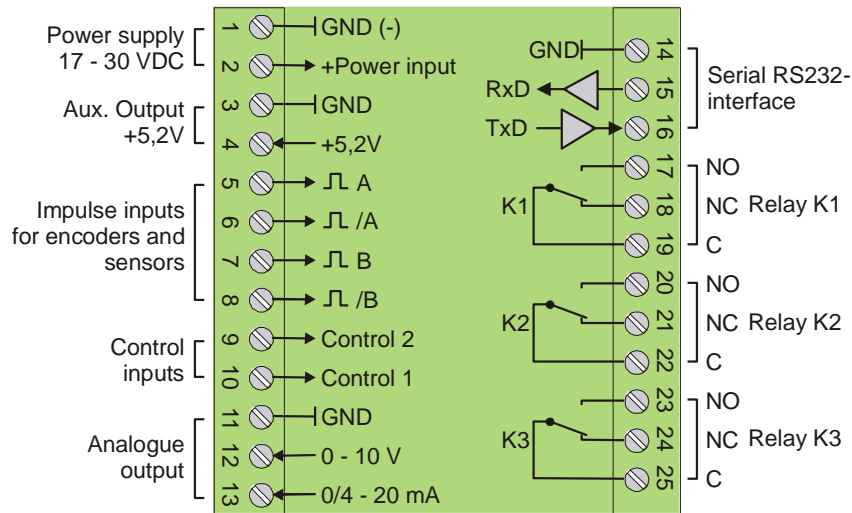| Terminal	Text	Function
01	GND	GND, common minus potential
02	Vin	Power input, +17 … 30 VDC
03	GND	GND, common minus potential
04	+5,2V	Aux. output 5.2 V / 200 mA
05	A	Impulse input, channel A
06	/A	Impulse input, channel /A (=A inverted)
07	B	Impulse input, channel B
08	/B	Impulse input, channel /B (=B inverted)
09	Control 2	Control input with programmable function
10	Control 1	Control input with programmable function
11	GND	GND, common minus potential
12	+10V Out	Analog output 0 … 10 V
13	20mA out	Analog output 0 … 20 mA
14	GND	GND, common minus potential
15	RXD	Serial RS232 interface, data input
16	TXD	Serial RS232 interface, data output
17	K1NO	Relay 1, normally open contact
18	K1NC	Relay 1, normally closed contact
19	K1C	Relay 1, common contact
20	K2NO	Relay 2, normally open contact
21	K2NC	Relay 2, normally closed contact
22	K2C	Relay 2, common contact
23	K3NO	Relay 3, normally open contact
24	K3NC	Relay 3, normally closed contact
25	K3C	Relay 3, common contact

4.2. DZ261
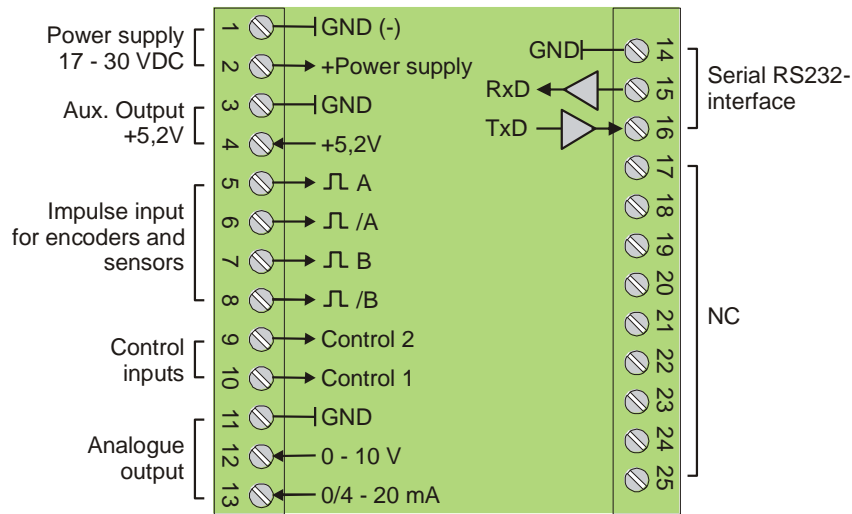

Terminal	Text	Function
01	GND	GND, common minus potential
02	Vin	Power input, +17 … 30 VDC
03	GND	GND, common minus potential
04	+5,2V	Aux. output 5.2 V / 200 mA
05	A	Impulse input, channel A
06	/A	Impulse input, channel /A (=A inverted)
07	B	Impulse input, channel B
08	/B	Impulse input, channel /B (=B inverted)
09	Control 2	Control input with programmable function
10	Control 1	Control input with programmable function
11	GND	GND, common minus potential
12	+10V Out	Analog output 0 … 10 V
13	20mA out	Analog output 0 … 20 mA
14	GND	GND, common minus potential
15	RXD	Serial RS232 interface, data input
16	TXD	Serial RS232 interface, data output
17	NC	Not connected
18	NC	Not connected
19	NC	Not connected
20	NC	Not connected
21	GND	GND, common minus potential
22	Com +	Common positive input for transistor outputs K1-K3
23	K1 out	Output K1, transistor PNP 30 V, 350 mA
24	K2 out	Output K2, transistor PNP 30 V, 350 mA
25	K3 out	Output K3, transistor PNP 30 V, 350 mA

4.3. DZ266

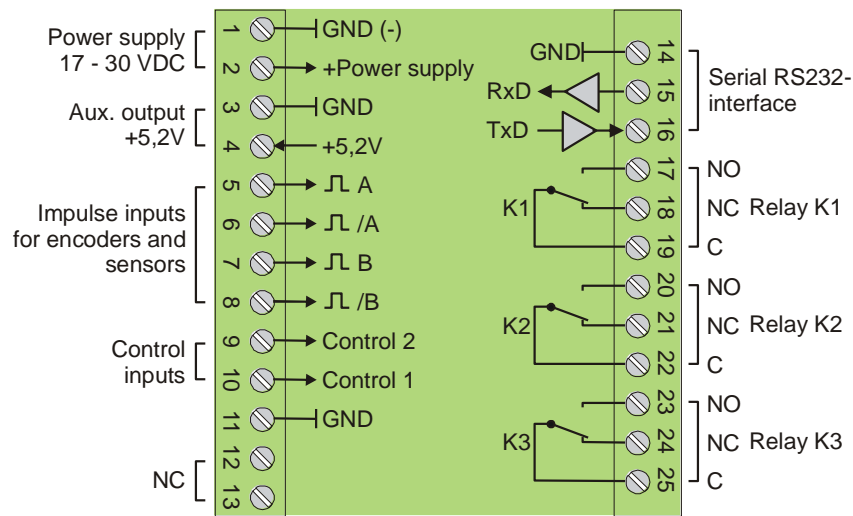| Terminal	Text	Function
01	GND	GND, common minus potential
02	Vin	Power input, +17 … 30 VDC
03	GND	GND, common minus potential
04	+5,2V	Aux. output 5.2 V / 200 mA
05	A	Impulse input, channel A
06	/A	Impulse input, channel /A (=A inverted)
07	B	Impulse input, channel B
08	/B	Impulse input, channel /B (=B inverted)
09	Control 2	Control input with programmable function
10	Control 1	Control input with programmable function
11	GND	GND, common minus potential
12	+10V Out	Analog output 0 … 10 V
13	20mA out	Analog output 0 … 20 mA
14	GND	GND, common minus potential
15	RXD	Serial RS232 interface, data input
16	TXD	Serial RS232 interface, data output
17	NC	Not connected
18	NC	Not connected
19	NC	Not connected
20	NC	Not connected
21	NC	Not connected
22	NC	Not connected
23	NC	Not connected
24	NC	Not connected
25	NC	Not connected

4.4. DZ267

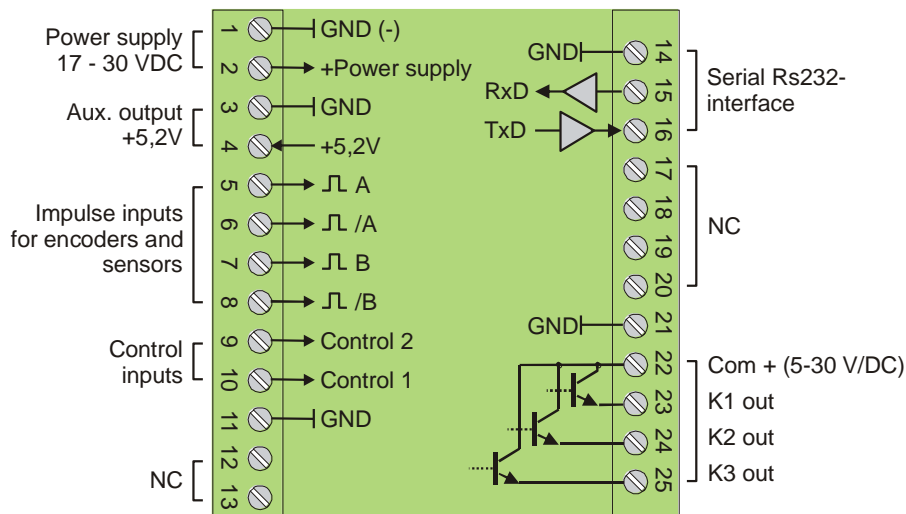| Terminal	Text	Function
01	GND	GND, common minus potential
02	Vin	Power input, +17 … 30 VDC
03	GND	GND, common minus potential
04	+5,2V	Aux. output 5.2 V / 200 mA
05	A	Impulse input, channel A
06	/A	Impulse input, channel /A (=A inverted)
07	B	Impulse input, channel B
08	/B	Impulse input, channel /B (=B inverted)
09	Control 2	Control input with programmable function
10	Control 1	Control input with programmable function
11	GND	GND, common minus potential
12	NC	Not connected
13	NC	Not connected
14	GND	GND, common minus potential
15	RXD	Serial RS232 interface, data input
16	TXD	Serial RS232 interface, data output
17	K1NO	Relay 1, normally open contact
18	K1NC	Relay 1, normally closed contact
19	K1C	Relay 1, common contact
20	K2NO	Relay 2, normally open contact
21	K2NC	Relay 2, normally closed contact
22	K2C	Relay 2, common contact
23	K3NO	Relay 3, normally open contact
24	K3NC	Relay 3, normally closed contact
25	K3C	Relay 3, common contact

4.5. DZ269

Terminal	Text	Function
01	GND	GND, common minus potential
02	Vin	Power input, +17 … 30 VDC
03	GND	GND, common minus potential
04	+5,2V	Aux. output 5.2 V / 200 mA
05	A	Impulse input, channel A
06	/A	Impulse input, channel /A (=A inverted)
07	B	Impulse input, channel B
08	/B	Impulse input, channel /B (=B inverted)
09	Control 2	Control input with programmable function
10	Control 1	Control input with programmable function
11	GND	GND, common minus potential
12	NC	Not connected
13	NC	Not connected
14	GND	GND, common minus potential
15	RXD	Serial RS232 interface, data input
16	TXD	Serial RS232 interface, data output
17	NC	Not connected
18	NC	Not connected
19	NC	Not connected
20	NC	Not connected
21	GND	GND, common minus potential
22	Com +	Common positive input for transistor outputs K1-K3
23	K1 out	Output K1, transistor PNP 30 V, 350 mA
24	K2 out	Output K2, transistor PNP 30 V, 350 mA
25	K3 out	Output K3, transistor PNP 30 V, 350 mA

4.6. Power Supply

The units require a DC supply from 17 to 30 V which must be applied to terminals 1 and 2. Depending on the input voltage level and internal states, the power consumption may vary and lies in a range of about 70 mA with a 24 V input (plus encoder currents taken from the auxiliary voltage output).

4.7. Auxiliary Output for Encoder Supply

Terminals 4 and 3 provide a +5.2 VDC / 200 mA auxiliary output for supply of encoders and sensors.

4.8. Impulse Inputs for Encoders and Sensors

The setup menu of the unit allows individual setting of the desired characteristics of the signal inputs. According to the application the units will accept single-channel signals (input A only with no direction information) as well as dual channel signals A/B including information of the direction of rotation. The following input formats and levels are acceptable:

- symmetric differential input with RS422 format A, /A, B, /B

- asymmetric (single-ended) TTL levels (A and/or B only without inverted channels)

- HTL level 10 … 30 V, alternatively differential (A, /A, B, /B) or single-ended (A and B only, without inverted channels)

- Signals from proximity switches or photocells providing HTL level (10 … 30 V)

- NAMUR (2-wire) signals

4.9. Control Inputs

Two programmable control inputs allow the assignment of functions like remote start-up-delay, reset of relay lock, hardware interlock of the keypad and similar.

Both inputs provide PNP characteristics and require HTL level. Also it is possible to set the control function to "active LOW" or "active HIGH".

For evaluation of dynamic events the desired "active edge" can be set (rising or falling edge)

4.10. Serial Interface

The serial RS232 interface in general may be used

- for easy setup and commissioning of the units (with use of the OS32 operator software)
- to change settings and parameters by PC or PLC during the operation
- to read out internal states and actual measuring values by PC or PLC

The subsequent drawing shows how to link the monitor with a PC, using the standard 9-pin SUB-D-9 connector
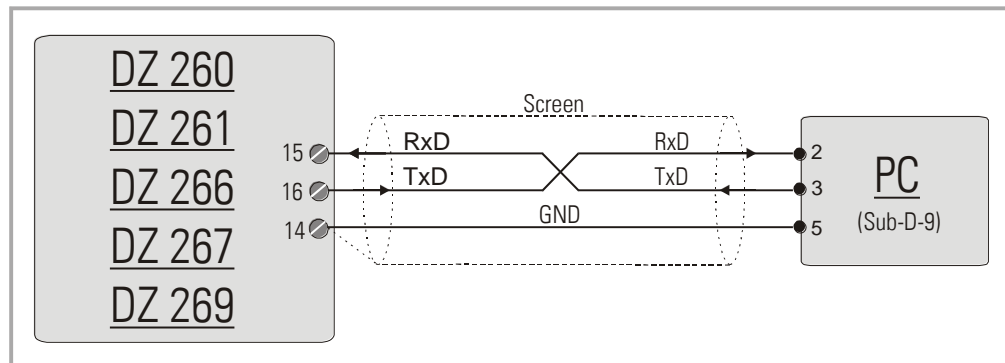
4.11. Relay Outputs K1 – K3 (DZ260 and DZ267 only)

The units provide three programmable relay outputs (all dry changeover), providing a switching capability of 30 V / 2 A DC or 125 V / 0.6 A AC or 230 V / 0.3 A AC. Both, switching characteristics and monitoring function may be programmed for each of the relays individually.

4.12. Transistor Outputs K1 – K3 (DZ261 and DZ269 only)

The units provide three outputs with programmable switching characteristics.
K1 – K3 are fast-switching and short-circuit-proof transistor outputs with a switching capability of 5 ... 30 V / 350 mA each. The switching voltage of the outputs must be applied remotely to the Com+ input (terminal 22). Both, switching characteristics and monitoring function may be programmed for each of the outputs individually.

4.13. Scalable Analog Output (DZ260, DZ261 and DZ266 only)

The units provide a voltage output with a +/-10 V range (max. load 2 mA) and a current output with ranges 0 / 4 ... 20 mA (burden 0 – 270 Ohm), however only one of the two can be used at a time. Beginning and end of the desired conversion range can be set by the operator menu (see section 7.2.7). The common potential of both outputs refers to GND.

The total resolution is 14 bits. A settling time of approx. 200 µs. is required. The overall response time of the analog outputs primarily depends on the selected Sampling Time setting. After volatile jumps of the input signal, the analog outputs may need up to two Sampling Time cycles (plus 200 µsec.) to stabilize.

> **Important note:** "voltage out" and "current out" <u>must not be used together</u>.
> **Please do never connect mA and V simultaneously!**

5. LCD Display and Keys

The units provide a back-lit LCD display with 2 lines at 16 characters each, and four keys for setup and command control.

During the setup procedure the LCD display indicates the menu with all parameter texts and the set values of the parameters.

During normal operation, the LCD display indicates the following information:

Actual speed value
Input frequency, scaled in user units

```
        +156.5 Hz
I:  LH    O: COO    +47 %
```

Analogue output (not with DZ267, DZ269)
Actual output level in % of full scale

O: Outputs (not with DZ266)
Actual switching states of relays/transistor outputs
(Rel1, Rel2, Rel3)/(out1, out2, out3)
C = Closed, O = Open

I: Inputs
Actual logical state of inputs
(Control1, Control2)
L = Low, H = High
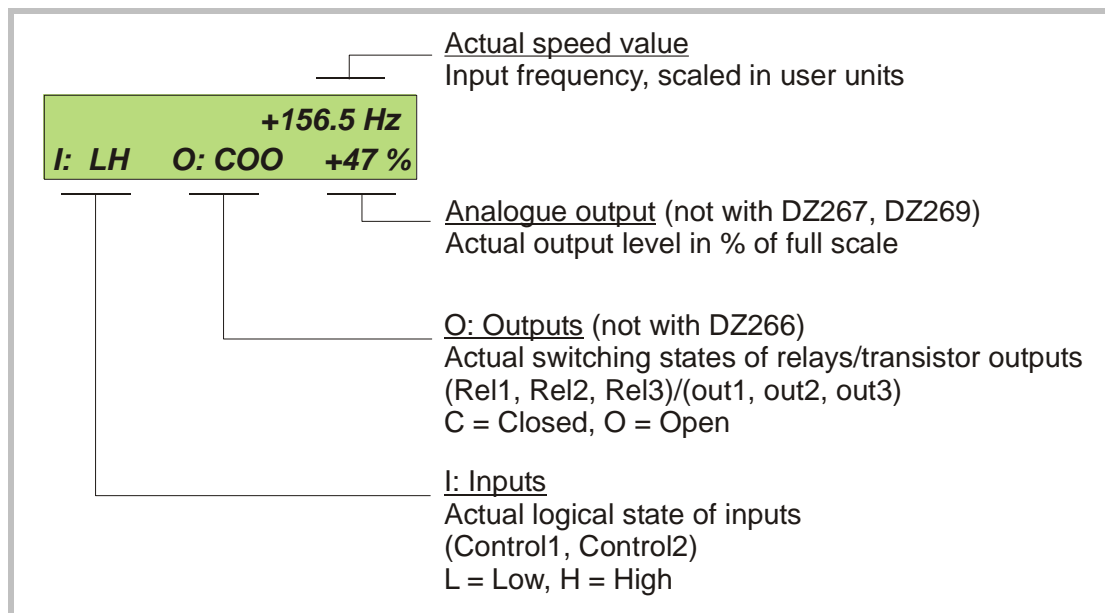
The "Display Menu" allows free scaling of the speed measuring values and the speed-related parameters to any kind of engineering units.

6. Keypad Operation

A summary of all parameters and a detailed description of parameter functions is available under section 6.

For all operation, the units provide four keys which subsequently will be named as shown below:

P	⬆	⬇	↵
PROG	UP	DOWN	ENTER

The key functions depend on the actual operating state of the units. Basically we have to distinguish between **Normal Operation** and **Setup Operation**

6.1. Normal Operation

While in normal operation state, the units monitor the speed according to the selected operational parameters and settings. Each of the front keys provides the command functions as attached to it upon setup in the "Command Menu"

6.2. Keypad Interlock

There is a 3-stage conception to protect the keys against unauthorized changes of the configuration respectively against activation of commands.

Stage	Protected Range	Protection by	Key Operations	
			Change of Parameters	Commands
1	---	---	permitted	permitted
2	Menu	Password upon activation of menu	Protection of selectable parts of the menu via password	permitted
3	Keyboard	Hardware-Latch 1	interlocked	permitted
		Hardware Latch 2	All functions interlocked	

The "Key Pad" menu allows to define an individual password for each group of parameters. This function can be used to provide individual access rights to different operators. Upon access to an interlocked section the unit asks for the corresponding password. If the correct password is not entered in time, the unit denies access and automatically returns to normal operation.

The hardware latch function can be activated and deactivated by one of the Control Inputs, or by means of serial access to the corresponding locking register.

> ⚠ **Using the Hardware Latch function may accidentally cause a total locking of all functions, when the Control Inputs characteristics have been set inauspiciously.**
> In this exceptional case you can release the key functions again by either
> a) applying the correct logical state (High or Low) to the inputs
> b) or resetting the parameters to their default values (see section 6.6)
> c) or change the parameters being responsible for the locking by PC

6.3. General Setup Procedure

To change over from normal operation to the setup state, please keep down the PROG key for at least 2 seconds. After this the menu appears and you can select one of the menu groups.
Inside each group you can select the desired parameter and edit the setting according to need. After this you are free to edit more parameters, or to return to normal operation.
The function of the different keys during setup is shown in the table below.

Key	Menu Level	Parameter Level	Setting Level
PROG	Save settings and return to normal operation	Return to Menu Level	Check entry, store result, then go back to Parameter Level
UP	Switch over to next menu	Select next parameter	Increment the highlighted digit or scroll the setting upwards
DOWN	Go back to previous menu	Select previous parameter	Decrement the highlighted digit or scroll the setting downwards
ENTER	Switch over to the Parameter Level of the current menu	Switch over to Setting Level	Shifts the highlighted digit one position to the left, or from utmost left to utmost right

6.4. Changing Parameters on the Setting Level

With signed parameters, the front digit can only be changed between „+" (positive) and „-„ (negative). The subsequent example explains how to change a parameter from originally **1024** to a new value of **250 000**.

The example assumes that you are already on the Setting Level, i.e. you have already selected the corresponding parameter and read its actual value on the display. Highlighted (blinking) digits are marked by background colour and indicate the cursor position.

No.	Display	Key action	Comment
00	001024		The actual value 1024 is displayed, with the last digit blinking
01		⬇ 4 x	Change last digit to 0
02	001020	↩	Shift cursor to left
03	001020	⬇ 2 x	Change highlighted digit to 0
04	001000	↩ 2 x	Shift curser to left by 2 positions
05	001000	⬇	Change highlighted digit to 0
06	000000	↩	Shift cursor to left
07	000000	⬆ 5 x	Change highlighted digit to 5
08	050000	↩	Shift cursor to left
09	050000	⬆ 2 x	Change highlighted digit to 2
10	250000	Ⓟ	Save new setting and return to Parameter Level

6.5. Return from the Menu, Time-Out Function

At any time the PROG key changes the Menu by one level backwards or fully back to the normal operation mode. The menu also switches automatically one level backwards, every time when for 10 seconds no key has been touched (Time-Out-Function).

6.6. Reset all Parameters to Factory Default Values

If applicable, the whole set of parameters can be reset to factory default values (e.g. because a code for the keypad interlocking has been forgotten, or because the unit does no more work correctly for reasons of bad settings). All default values are indicated in the following parameter tables.

To execute this Reset procedure, you have to take the following steps:

- Power the unit down
- Press ⬇ and ⬆ simultaneously
- Switch power on with both keys held down

⚠ When execute this action, please be aware that all parameter settings will be lost and the whole setup procedure must be repeated!

7. Menu Structure and Parameter Description

All parameters are combined to groups, arranged in several menus. Settings are only necessary for parameters which are really relevant for the individual application.

7.1. Survey of Menus

This section provides an overview of the menus and their assignments to the different functions of the units. The menu names are printed bold, and associated parameters are arrayed directly under the menu names.

Menu texts are in English language, according to the presentation on the LCD display

Preselect.-Menu*
Preselection 1
Preselection 2
Preselection 3

Encoder-Menu
Encoder Proper
Direction
Sampling Time
Wait Time
Filter
Set Value

Ser.Readout Menu
Multiplier
Divider
Offset

Special-Menu
Linear Mode**
Freq. Control
Input Filter

Key-Pad-Menu
Protect Menu M01
Protect Menu M02
Protect Menu M03
…
Protect Menu M09
Protect Menu M10
Protect Menu M11

Command-Menu ***
Key Up Func.
Key Down Func.
Key Enter Func.
Input 1 Config.
Input 1 Func.
Input 2 Config.
Input 2 Func.

Analog-Menu **
Analogue Format
Analogue Start
Analogue End
Analogue Swing
Analogue Offset
Analogue ABS

Serial-Menu
Unit Number
Serial Baud Rate
Serial Format
Serial Protocol
Serial Timer
Register Code

Switching-Menu*
Pulse Time 1
Pulse Time 2
Pulse Time 3
Hysteresis 1
Hysteresis 2
Hysteresis 3
Preselect Mode 1
Preselect Mode 2
Preselect Mode 3
Output Polarity
Start up Mode
Start up Relay
Lock Relay
Standstill Time

Linear.-Menu **
P1(x)
P1(y)
P2(x)
P2(y)
..
P14(x)
P14(y)
P15(x)
P15(y)

Display-Menu
Up-Date-Time
Display Mode
Encoder Factor
Multiplier

(*)	not relevant with DZ266
(**)	not relevant with DZ267, DZ269
(***)	partially inactive with DZ266

7.2. Parameter Descriptions

7.2.1. Preselection's

> ☞ Preselection parameters are not relevant for model DZ266

These parameters assign the desired switching points to the relays/outputs. The preselection's use the same engineering units as the display of the actual speed (see **Display-Menu**).

Preselection Menu	Code	Setting Range	Default
Preselection1 Switching point of relay 1/ out 1 (engineering units)	„00"	-1 000 000.0 ... +1 000 000.0	100.0
Preselection2 Switching point of relay 2/ out 2 (engineering units)	„01"	-1 000 000.0 ... +1 000 000.0	200.0
Preselection3 Switching point of relay 3/ out 3 (engineering units)	„02"	-1 000 000.0 ... +1 000 000.0	300.0

7.2.2. Definitions for the Encoder or Speed Sensor

Encoder-Menu		Code	Setting Range	Default
Encoder Proper Encoder properties 0 A/B/90° quadrature, RS422 or HTL differential 1 A/B/90° quadrature, single-ended, HTL NPN* 2 A/B/90° quadrature, single-ended, HTL PNP 3 A/B/90° quadrature, single-ended, TTL level 4 A=Impulse, B=direction, RS422 or HTL differential 5 A=Impulse, B=direction, single-ended, HTL NPN* 6 A=Impulse, B=direction, single-ended, HTL PNP 7 A=Impulse, B=direction, single-ended, TTL level 8 Channel A only, RS422 or HTL differential 9 Channel A only, single-ended, HTL NPN* 10 Channel A only, single-ended, HTL PNP 11 Channel A only, single-ended, TTL level		„A0"	0 … 11	0
Direction Definition of the direction of rotation with quadrature encoders 0 forward when A leads B 1 forward when B leads A		„A1"	0, 1	0

> ☞ (*) With settings HTL / NPN the input terminals are connected to the power supply voltage of the unit (+24 V) via internal pull-up resistors. For this reason it is advisable to first set the encoder properties correctly, prior to connecting TTL encoders to the unit.
>
> Setting HTL / NPN is also suitable for use with NAMUR (2-wire) proximities.
> (connect the positive wire of the sensor to the input terminal and the negative wire to GND)

Encoder-Menu		Code	Setting Range	Default
Sampling Time Internal time base for sampling of the input frequency (sec.)		„A2"	0.001..9.999	0.001
Wait Time Time to wait before unit detects zero speed (sec.) Impulse distances greater than this time will be takes as zero		„A3"	0.01..9.99	1.00

Filter
Digital filter for smoothing of unstable frequencies
0   Filter off
       (very fast response to frequency changes)
1   T (63%) = 1,9 msec. with Sampling Time = 1msec.
2   T (63%) = 3,8 msec. with Sampling Time = 1msec.
       etc.
7   T (63%) = 122 msec. with Sampling Time = 1msec.
       (very slow response to frequency changes)
		„A4"	0..7	0

Set Value Fixed frequency set value for encoder simulation (Hz) (see also "Command"-Menu)		„A5"	-1 000 000.0 ... +1 000 000.0	0

7.2.3.   Serial Readout Menu

An actual value proportional to the input frequency can be read out via serial link, accessing the serial readout register (code **:8**). As a Basic Value this register uses the scaling set for the analog output, i.e. a range from 0 to 10 000 units corresponding to 0 - 100,00 % of the full scale output (see section 7.2.7 "Analog Menu"). This readout can still be rescaled to user-friendly engineering units, using the following parameters:

Serial Readout Menu	Code	Setting Range	Default
Multiplier	„A8"	-9.9999 … +9.9999	+1.0000
Divider	„A9"	0.0000 … 9.9999	0.0000
Offset (absolute term)	„B0"	-99999999 … +99999999	0

$$\text{Readout (:8)} = \text{Basic Value} \times \frac{\text{Multiplier}}{\text{Divider}} + \text{Offset}$$

- The definition of the "Basic Value" occurs in the "Analog Menu" and is also available for the DZ267 units without analog output
- the ratio Multiplier / Divider must never be greater than 15 000
- Setting "Divider" to zero will skip the rescaling procedure, resulting in a shorter response time with all functions of the unit

More details about serial communication can be found in the appendix.

7.2.4. Special-Menu

Special-Menu		Code	Setting Range	Default
Linear Mode Programmable linearization for Basic Value and Analog Output 0 Linearization off 1 Linearization range 0 V … +10 V 2 Linearization range -10 V … +10 V		„B3"	0..2	0
Freq. Control Defines behaviour and response of the unit to sudden interruptions of the input frequency. This parameter must only be changed in very special cases and under special instruction of an motrona engineer. Otherwise please use always the default setting "2"!		„B4"	0..2	2
Input Filter Digital filter for limitation of the input frequency 0 Filter off, the full range of frequency will be evaluated 1 Filter to cut frequencies higher than 500 kHz 2 Filter to cut frequencies higher than 100 kHz 3 Filter to cut frequencies higher than 10 kHz		„B5"	0..3	0

> Using the Input Filter will cause wrong frequency measurement when you use the unit with frequencies higher than indicated above.

7.2.5. Key-Pad-Menu

Key-Pad-Menu (Passwords for menu groups)	Code	Setting Range	Default
Protect Menu 01 (Preselect.-Menu**)**	„C0"	0..999999	0
Protect Menu 02 (Encoder-Menu**)**	„C1"		
Protect Menu 03 (Ser.Readout.-Menu**)**	„C2"	0 = no interlock	
Protect Menu 04 (Special-Menu**)** a)	„C3"		6079
Protect Menu 05 (Key-Pad-Menu**)**	„C4"	1 – 999 999 =	
Protect Menu 06 (Command-Menu**)**	„C5"	password for the	
Protect Menu 07 (Analog-Menu**)**	„C6"	corresponding	
Protect Menu 08 (Serial-Menu**)**	„C7"	group	
Protect Menu 09 (Switching-Menu**)**	„C8"		
Protect Menu 10 (Linear-Menu**)**	„C9"		
Protect Menu 11 (Display-Menu**)**	„D0"		

a) This menu is protected by the password **6079** due to factory setting. After entry of the password please press the Enter button ⏎ at least 2 seconds.

7.2.6. Command-Menu

Command-Menu (assignment of functions)	Code	Setting Range	Default
Key Up Func. Supplementary command function of the UP key 0 no function 1 Activation of a serial data transmission 2 Force programmed relay/output states / freeze (a)(c) 3 Frequency simulation according to parameter "Set Value" 4 Freeze actual input frequency 5 Remote start-up-delay function (a) 6 Release lock of relay 1 (a) 7 Release lock of relay 2 (a) 8 Release lock of relay 3 (a) 9 Release lock of all relays 1-3 (a)	„D7"	0..9	0
Key Down Func. Supplementary command function of the DOWN key (see UP)	„D8"	0..9	0
Key Enter Func. Supplementary command function of the ENTER key (see UP)	„D9"	0..9	0
Input 1 Config. Switching characteristics of input „Control1" 0 Static low 1 Static High 2 Dynamic, rising edge 3 Dynamic, falling edge	„E0"	0..3	0
Input 1 Func. Control function of input „Control1" 0 no function 1 Activation of a serial data transmission 2 Force programmed relay/output states / Freeze (a)(c) 3 Frequency simulation according to parameter "Set Value" 4 Freeze actual input frequency 5 Remote start-up-delay function (a) 6 Release lock of relay 1/transistor output 1 (a) 7 Release lock of relay 2/transistor output 2 (a) 8 Release lock of relay 3/transistor output 3 (a) 9 Release lock of all relays 1-3/output 1-3 (a) 10 Interlock for parameter access via keypad (b) 11 Total keypad interlock (b) 12 Command monitor for remote motion enable signal	„E1"	0..12	0
Input 2 Config. (see Input 1 Config.)	„E2"	0..3	0
Input 2 Func. (see Input 1 Func.)	„E3"	0..12	0

(a) these parameters are not relevant for model DZ266.

(b) see section 6.2   (c) see section 9.3   (d) see section 9.4

7.2.7. Analog-Menu

Analog-Menu (settings for analog outputs)	Code	Setting Range	Default
Analogue Format Output format and range of the analog output **0** -10 V to +10 V **1** 0 V to +10 V **2** 4 mA to 20 mA **3** 0 mA to 20 mA	„E6"	0..3	0
Analogue Start *) Start value (engineering units) for 0 V resp. -10 V or 0 mA / 4 mA **Please note:** „Analog Start" represents the value, where the analog output should start with 0 V.)* … *see example below*	„E7"	- 1000000.0 … + 1000000.0	+0000000.0
Analogue End End value (engineering units) for 10 V or 20 mA	„E8"	- 1000000.0 … + 1000000.0	+0001000.0
Analogue Swing Max. output value (1.00 = 10 V or 20 mA) Example: adjustment for a limitation to 8 V = 00.80	„E9"	0 … 10.00	01.00
Analog Offset Shift of the zero position (mV)	„F0"	-9999 … 9999	0000
Analogue ABS Only positive voltage values are displayed. **Please note:** Independent of the parameters Analogue Start and Analogue End, only positive values are displayed. At normal case (Analogue ABS=0) the displayed voltage value is for example -1,234V. If Analogue ABS=1, in this case 1,234V would be displayed.	„F1"	0 … 1	0

> The settings above are at the same time used to generate the Basic Value 0 - 10 000 (corresponding to 0 - 100,00 %), which finally can be read out from the serial register with access code :8 (see 7.2.3)

*)   **Example:** If a display range of -250 to +250 must output a proportional analog range from -10 V to +10 V, the "Analog Start" parameter must be set to **0** and the "Analog End" value to **+250**.

7.2.8. Serial Menu

Serial transmissions will operate in either the "PC Mode" or in "Printer Mode".

With "PC-Mode", the unit receives a request string and responds with a corresponding data string. For details of the protocol see separate description "SERPRO".

With "Printer Mode" the unit sends data without any request and under Timer control as described subsequently.

As soon as the unit receives a character, it automatically switches over to PC Mode and operates according to protocol. When for a period of 20 sec. no character has been received, the unit switches automatically back to "Printer Mode" and starts cyclic data transmission again.

Serial -Menu (Configuration of the serial link)	Code	Setting Range	Default
Unit Number (Serial device address) A unit number between 11 and 99 can be assigned to each unit. The address must not contain any zeros (0) since these addresses are reserved for collective addressing of several units.	„90"	11 … 99	11
Serial Baud Rate (Transmission speed) 0= 9600 Baud 1= 4800 Baud 2= 2400 Baud 3= 1200 Baud 4= 600 Baud 5= 19200 Baud 6= 38400 Baud	„91"	0..6	0
Serial Format (Format of transmit data) 0= 7 Data, Parity even, 1 Stop 1= 7 Data, Parity even, 2 Stop 2= 7 Data, Parity odd, 1 Stop 3= 7 Data, Parity odd, 2 Stop 4= 7 Data, no Parity, 1 Stop 5= 7 Data, no Parity, 2 Stop 6= 8 Data, Parity even, 1 Stop 7= 8 Data, Parity odd, 1 Stop 8= 8 Data, no Parity, 1 Stop 9= 8 Data, no Parity, 2 Stop	„92"	0 … 9	0

Serial -Menu (Configuration of the serial link)	Code	Setting Range	Default
Serial Protocol Determines the sequence of characters sent, when you use the serial output for cyclic data transmission under timer control (xxxxxxx is the measuring value transmitted). 0= Transmission = Unit Nr. – Data, LF, CR 1= Transmission = Data, LF, CR Setting "1" removes the unit address from the string which allows a slightly faster transmission cycle.	„F3"	0 … 1	0
Serial Timer This register determines the cycle time in seconds for cyclic transmission when the Printer Mode is switched on. With setting "0" all cyclic transmission is switched off and the unit will only send data upon request (PC mode).	„F4"	0 … 9.99	0
Register Code Serial access code of the register which, in Printer Mode, should be transmitted with every cycle. The most important registers are shown below.	„F5"	0 … 19 (:0) … (;9)	8

For Serial Protocol, the Unit No. table:

			Unit No.								
0:	1	1	+/-	X	X	X	X	X	X	LF	CR
1:			+/-	X	X	X	X	X	X	LF	CR

For Register Code:

Setting	Code	Register contents
7	:7	Actual analog output value 10000 = 10 V = 20 mA
8	:8	User-defined readout value (see 7.2.3)
9	:9	Frequency detected on the input (Scaling is 0.1 Hz)
11	;1	Actual LCD display value

7.2.9. Switching –Menu

> These parameters are **not** relevant for model DZ266.
> Indications | f | mean that only the absolute value of the frequency is considered. With all other indications, frequencies are categorically signed (+ with forward and - with reverse)

Switching -Menu (Switching characteristics of relays/outputs)	Code	Setting Range	Default
Pulse Time 1 <u>Rel.1</u>: Duration of timed output, sec. (0=static)	„F8"	0 … 9.99	0
Pulse Time 2 <u>Rel.2</u>: Duration of timed output, sec. (0=static)	„F9"	0 … 9.99	0
Pulse Time 3 <u>Rel.3</u>: Duration of timed output, sec. (0=static)	„G0"	0 … 9.99	0
Hysteresis 1 <u>Rel.1</u>: Switching Hysteresis (engineering units)	„G1"	0 … 99999.9	0
Hysteresis 2 <u>Rel.2</u>: Switching Hysteresis (engineering units)	„G2"	0 … 99999.9	0
Hysteresis 3 <u>Rel.3</u>: Switching Hysteresis (engineering units)	„G3"	0 … 99999.9	0

Preselect Mode 1 (switching operation for relay 1/output 1)
0   $\|f\| >= \|Preselection\|$ (catch*)
1   $\|f\| <= \|Preselection\|$ with start-up-delay (catch*)
2   $\|f\| == \|Preselection\|$ with start-up-delay (catch*)
3   Standstill (f=0) after expiration of standstill time
4   f >= Preselection (catch*)
    (also suitable for signalization of forward direction)
5   f <= Preselection (catch*)
    (also suitable for signalization of reverse direction)
6   f == Preselection (catch*)
7   Relay/output signals "forward" when a positive frequency (f > 0) is detected. This information disappears upon detection of "standstill"
8   Relay/output signals "reverse" when a negative frequency (f < 0) is detected. This information disappears upon detection of "standstill"
	„G4"	0..9	0

9 f > (Preselection + Hysteresis) or f < (Preselection – Hysteresis) with start-up suppression and latch *) The parameter Preselection forms the center, the hysteresis specifies the area around.			
Preselect Mode 2 (switching operation for relay 2/output 2) see Preselection Mode 1	„G5"	0..8	0
Preselect Mode 3 (switching operation for relay 3/output 3) see Preselection Mode 1	„G6"	0..8	0

*)   The corresponding relay/output can be used with catch operation, when a catch function has been assigned to it under parameter „Lock Relay".

Switching -Menu (Switching characteristics of the relays/outputs)	Code	Setting Range	Default
Output Polarity (Relay/output active „on" or active „off" *) Parameter with binary interpretation 0 all Relays are energized when the assigned event occurs 1 Relay 1/transistor output 1 inverted 2 Relay 2 transistor output 2 inverted 3 Relay 1&2 transistor output 1&2 inverted 4 Relay 3 transistor output 3 inverted 5 Relays 1&3 transistor output 1&3 inverted 6 Relays 2&3 transistor output 2&3 inverted 7 All relays inverted	„G7"	0..7	0
<u>Start-up Mode</u> **Start-up-delay after power-up and after standstill** 0 No start-up-delay 1 Start-up-delay 1 second 2 Start-up-delay 2 seconds 3 Start-up-delay 4 seconds 4 Start-up-delay 8 seconds 5 Start-up-delay 16 seconds 6 Start-up-delay 32 seconds 7 Start-up-delay 64 seconds 8 Start-up-delay 128 seconds 9 Automatic delay until to first overstepping of the set value 10 Start-up-delay by remote signal	„G8"	0..10	0
<u>Start up Relay / Switching Output</u> **Assignment of a start-up-delay function to the relays/outputs** 0 No start-up-delay for any of the relays 1 Relay 1/transistor output 1 provides start-up-delay 2 Relay 2/transistor output 2 provides start-up-delay 3 Relays 1&2/transistor output 1&2 provide start-up-delay 4 Relay 3/transistor output 3 provides start-up-delay 5 Relays 1&3/transistor output 1&3 provide start-up-delay 6 Relays 2&3/transistor output 2&3 provide start-up-delay 7 All relays provide start-up-delay	„G9"	0..7	0

*)   Active "on" means the relay/output will be energized upon occurrence of the assigned event.
         Active "off" means the relay/output will be de-energized upon occurrence of the assigned event.

Switching -Menu (Switching characteristics of the relays/outputs)	Code	Setting Range	Default
Lock Relay /Switching Output Assignment of a catch function to the relays *) 0 No catch function for any of the relays 1 Relay 1/output 1 with catch (release by key/control input) 2 Relay 2/output 2 with catch (release by key/ control input) 3 Relays 1&2/output 1&2 with catch (release by key/control input) 4 Relay 3/output 3 with catch (release by key/control input) 5 Relays 1&3/output 1&3 with catch (release by key/control input) 6 Relays 2&3/output 2&3 with catch (release by key/control input) 7 all Relays/outputs with catch (release by key/control input) 8- similar to 0 - 7, but catch to release by key/by control input and 15 automatically upon standstill	„H0"	0..15	0
Standstill Time Time setting for standstill definition A time of xx.xx seconds after detection "zero input frequency" the unit signals "standstill" and re-activates the start-up-delays	„H1"	0..99.99	0
Relay / Switching Output Action (for more details see section 9.3) Selection of the relays/transistor outputs of which the switching state should be overridden by key command or remote command (non-selected relays will continue normally) 0 No relay/transistor output selected 1 Relay 1/transistor output 1 2 Relay 2/transistor output 2 3 Relays 1 & 2/transistor output 1&2 4 Relay 3/transistor output 3 5 Relays 1 & 3 /transistor output 1&3 6 Relays 2 & 3/transistor output 2&3 7 All relays/transistor outputs selected 8 Freeze actual switching state of all relays/transistor outputs	„K8"	0…8	0

*) According to parameter settings, the catch situation can be released by either pressing one of the front keys or by a remote control signal or automatically upon detection of standstill (see "Command menu").

Switching -Menu (Switching characteristics of the relays/outputs)	Code	Setting Range	Default
Action Polarity (for more details see section 9.3) Desired override state of the corresponding relays/transistor outputs (parameter is out of function when "Relay Action" is set to "8")	„K9"	0…7	0

Setting	Relay/out K1	Relay/out K2	Relay/out K3
0	0	0	0
1	1	0	0
2	0	1	0
3	1	1	0
4	0	0	1
5	1	0	1
6	0	1	1
7	1	1	1

0 = Coil of the relay is de-energized – transistor output off.
1 = Coil of the relay is energized – transistor output on

7.2.10. Linear.-Menu

Linear.-Menu (Interpolation points for linearization)	Code	Setting Range	Default
P1(x) % Interpolation point 1, original value	„H2"	-100.000...100.000	100.000
P1(y) % Interpolation point 1, substitute value	„H3"		
P2(x) etc.	„H4"		
P2(y) etc.	„H5"		
P3(x)	„H6"		
P3(y)	„H7"		
P4(x)	„H8"		
P4(y)	„H9"		
P5(x)	„I0"		
P5(y)	„I1"		
P6(x)	„I2"		
P6(y)	„I3"		
P7(x)	„I4"		
P7(y)	„I5"		
P8(x)	„I6"		
P8(y)	„I7"		
P9(x)	„I8"		
P9(y)	„I9"		
P10(x)	„J0"		
P10(y)	„J1"		
P11(x)	„J2"		
P11(y)	„J3"		
P12(x)	„J4"		
P12(y)	„J5"		
P13(x)	„J6"		
P13(y)	„J7"		
P14(x)	„J8"		
P14(y)	„J9"		
P15(x)	„K0"		
P15(y)	„K1"		
P16(x)	„K2"		
P16(y)	„K3"		

7.2.11.   Display –Menu

Display -Menu		Code	Setting Range	Default
<u>Up-Date-Time</u> Update time of the LCD display (seconds)		„K4"	0.05...1.00	0.10
<u>Display Mode</u> Scaling of the unit's engineering units and the actual LCD display 0 Hz 1 kHz (switch points and analog output remain in Hz) 2 RPS (revolutions per second) = f / Encoder Factor (*) 3 RPM (revolutions per minute) = 60 x f / Encoder Factor (*) 4 Customer-specific units set by Encoder-Factor und Multiplier Display = f x Multiplier / Encoder Factor (*)		„K5"	0..4	0
<u>Encoder Factor</u> number of impulses per revolution "ppr" (with Display-Modes 2 – 4 only)		„K6"	1..99999	1
<u>Multiplier</u> Impulse multiplier (with display-Mode 4 only) Display = f x Multiplier / Encoder Factor		„K7"	1..200	1

*)   f = Input frequency in Hz
     With display modes 2 – 4 also the switching point settings will use the same engineering units
     as set for the display

8. Example for Commissioning

The following example is to explain setup and commissioning of the units with a typical application.

- A tooth wheel with 32 teeth should be monitored with respect to speed and standstill
- For speed pick-up we use two proximity switches "Namur-type", which for detection of the direction of rotation are mechanically displaced to generate an impulse offset
- Relay 1 should signal "standstill" when one second after detection of "zero frequency" no further input impulse has been registered
- Relay 2 should generate a timed output pulse of 0.3 seconds when the speed drops below 100 RPM in either forward or reverse direction.
- Relay 3 should switch on and catch when, with forward direction only, the speed exceeds 300 RPM. With reverse direction relays 3 should not respond at all
- Release of the relay 3 catch state should be possible by either a positive signal applied to input "Control1", or by activating the ENTER key.
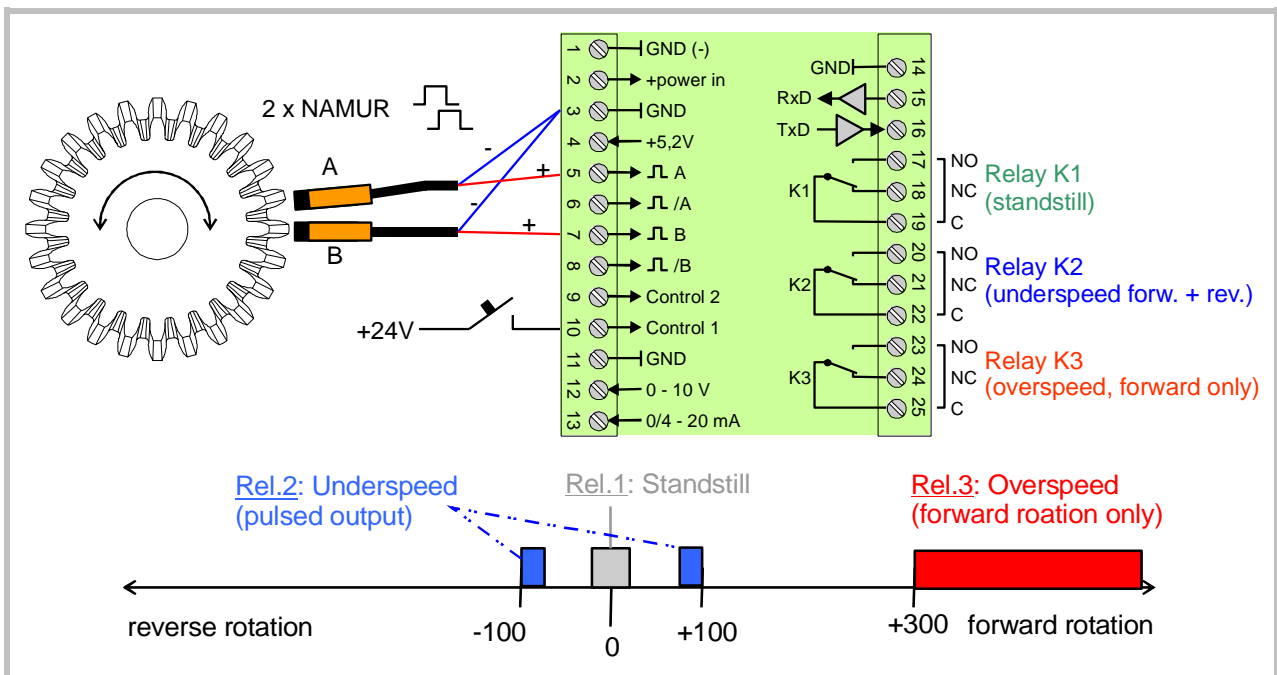
The table below shows the setup procedure for an application according to the previous example. Parameters which are not mentioned are optional, but not relevant for this function.

Nr,	Menu	Parameter	Value	Function
1	Preselect Menu	Preselection1	---	unimportant (relay 1 is used for standstill)
		Preselection2	100	Switching point for "underspeed"
		Preselection3	300	Switching point for "overspeed"
2	Encoder Menu	Encoder Proper.	=1	A/B/90°, HTL / NPN for two displaced Namur sensors
		Wait Time	=5,00	Frequencies < 0,2 Hz are considered as "0"
3	Command Menu	Key Enter Func.	=7	ENTER key to release the relay 3 catch
		Input 1 Config.	=1	Function of "Control1" input is static HIGH
		Input 1 Func.	=7	"Control1" input to release the relay 3 catch
4	Switching Menu	Pulse Time 1	=0	Relay 1 static
		Pulse Time 2	=0.30	Relay 2 timed output 0.3 seconds
		Pulse Time 3	=0	Relay 3 static
		Presel. Mode1	=3	Relay 1 energizes after lapse of standstill time
		Presel. Mode2	=1	Relay 2 energizes when absolute value underpasses
		Presel. Mode3	=4	Relay 3 energizes with positive overstepping only
		Output Polarity	=0	All relays with non-inverted function (energize)
		Start-up Mode	=0	No start-up-delay function
		Start-up Relay	=0	No relay assignment to start-up-delay
		Lock Relay	=4	Relay 3 to operate with catch function
		Standstill Time	=1.00	Standstill output 1 second after detection of "frequency = 0" (i.e. 6 seconds after the last input pulse)
5	Display Menu	Display Mode	=3	Engineering units are RPM
		Encoder Factor	=32	Tooth wheel generates 32 pulses per revolution
		Multiplier	=1	No specific impulse scaling

9. Appendix

9.1. Hints for Use of the Linearization Function

The linearization function of these units allow to convert a linear input frequency into a non-linear developing, which can be indicated on the LCD display and which is also available as analog signal or as serial data, for further processing.

There are 16 programmable x/y coordinates available, which can be set in any desired distance over the full conversion range. Between two coordinates, the unit uses linear interpolation. Therefore it is advisable to use more coordinates in a range with strong curves and only a few coordinates where the curvature is less.

To specify an individual linearization curve, the „Linearisation Mode" register must be set to either 1 or 2.

The registers P1(x) to P16(x) are used to specify the coordinates on the x-axis. These are the measuring values that the unit normally would generate according to the actual input frequency. These settings must be in % of full scale.

Now enter the attached values to registers **P1(y)** to **P16(y)**. These are the values that the unit will generate instead of the x- values, i.e. P2(y) will substitute P2(x) etc.

- x-registers must use continuously increasing settings, i.e. P1(x) must have the lowest and P16(x) must have the highest setting
- All entries use a percental format of xx.xxx% full scale. Setting 000.000 % means zero output and setting 100.000 % means full scale output.
- With Linearisation Mode set to 1, it is a must to set P1(x) to 0 % and P16(x) to 100 %. Linearisation is defined in the positive range only and the negative range will be a mirror image of the positive range with reference to zero.
- With Linearisation Mode set to 2, it is a must to set P1(x) to –100 % and P16(x) to +100 %. This enables the user to set curves which are not symmetric to the zero position.
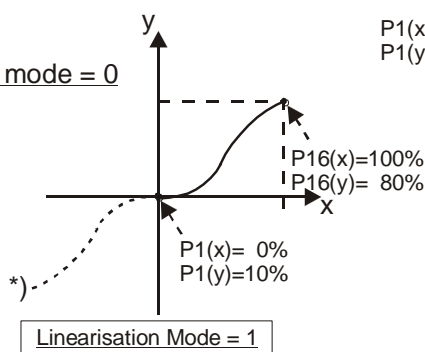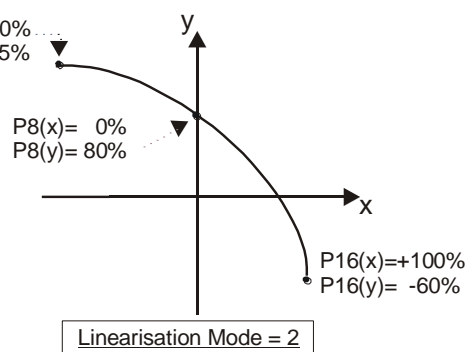
9.2. Data Readout via Serial Interface

All register codes shown in the "Serial Menu" are available for serial readout by PC or PLC. For communication the monitors use the Drivecom Protocol according to ISO 1745. All protocol details can be found in our manual **SERPRO_2a.doc** which is available for download from our homepage www.motrona.com.

To request for a data transmission you must send the following request string to the converter:

EOT		AD1	AD2	C1	C2	ENQ

EOT = control character (Hex 04)
AD1 = unit address, High Byte
AD2 = unit address, Low Byte
C1 = register code, High Byte
C2 = register code, Low Byte
ENQ = control character (Hex 05)

The following example shows the request string for readout of the actual input frequency of a monitor (code :9) from a unit with unit address 11:

ASCII Code:	EOT	1	1	:	9	ENQ
Hex Code:	04	31	31	3A	39	05
Binary Code:	0000 0100	0011 0001	0011 0001	0011 1010	0011 1001	0000 0101

After a correct request, the unit will respond:

STX	C1	C2	x x x x x x x	ETX	BCC

STX = control character (Hex 02)
C1 = register code, High Byte
C2 = register code, Low Byte
xxxxx = readout data
ETX = control character (Hex 03)
BCC = block check character

For all further details see SERPRO_2a.doc.

9.3. "Relay Action", override relay states by programmed states

Models providing relay outputs allow to temporary change the actual relay states according to a programmable ON / OFF pattern, or to temporary freeze the actual switching states. These override functions can be activated by either touching a front key or by a remote command.

9.3.1. Override relay/output states by programmable ON / OFF states

Parameter "**Relay Action**" allows to select which of the relays/outputs should be affected by the override action. Parameter "**Action Polarity**" provides setting of the desired "ON / OFF" pattern» (see section 7.2.9, "Switching Menu"). The desired way of activation this override command can be set by the "**Command-Menu**" (see 7.2.6).

Application example:
You would like to temporary de-energize relays K1 and K3 by touching the key "UP", whilst relay K2 should continue to function normally.

	Action	Parameter settings
1	Assign the Override Command to key "UP"	Key Up Func. = 2
2	Select relays/outputs K1 and K3	Relay Action = 5
3	Set the desired switching state of the relays/outputs (both de-energized)	Action Polarity = 2

9.3.2. Freeze the actual switching state of all relays

This function will temporary freeze all relays in their actual state for the duration where you press a key or apply a remote command. During the freeze period the relays will no more follow any changes of the input frequency

Application example:
You would like to freeze all relays by applying a "High" signal to input "Control1"

	Action	Parameter settings
1	Assign the Freeze command to input "Control1"	Input 1 Func. = 2
2	Set the input to "Active High" characteristics	Input 1 Config = 1
3	Assign the "Freeze relays" function to the input	Relay Action = 8

☞	• These commands will override the switching states of the selected relays/outputs. All relays/outputs will immediately return to the actual control state after removing the override command. All internal measuring and control cycles will continue normally. • To use these functions, please set the corresponding key and input characteristics to static operation only, since dynamic (edge-triggered) operation would make no sense

9.4. Monitoring of remote motion enable signals

The unit provides a special "Command Monitor" function for logical control of a motion enable signal and the resulting response of the system. In addition to the normal monitoring functions this mode is suitable to generate alarm outputs under any of the following conditions:

- motion is disabled, but still the system moves
- motion is enabled, but the system does not move at all (mechanical deadlock), or the system does not reach the scheduled speed within an expected time (overload)
- the motion command changes over from "enable" to "disable" but the system does not come down to standstill within an expected time

The following parameter settings will activate the Command Monitor function:

9.4.1. Definition of a speed window

The application requires one of the relays to operate in overspeed mode (Preselect Mode = 0) and another relay to operate in underspeed mode (Preselect Mode = 1). This will define a window for the expected speed under regular motion conditions (see 7.2.9)

9.4.2. Assignment of a control input

One of the two control inputs has to be set to the control function "12" to activate the monitoring of the command. This input must be connected to the remote Enable/Disable signal (see parameters "Input Function" under 7.2.6)

9.4.3. Assignment of the control polarity

Parameter "Input Config" provides setting of the input polarity as follows:

Input Config = 0   =>   Motion **disabled** (stop) corresponds to input level **"LOW"**
                          Motion **enabled** (run) corresponds to input level **"HIGH"**

Input Config = 1   =>   Motion **disabled** (stop) corresponds to input level **"HIGH"**
                          Motion **enabled** (run) corresponds to input level **"LOW"**

9.4.4. Setting of a Start-up delay time

Any signal changes from "disable" to "enable" or vice-versa will require some delay until the system could really follow the command (acceleration or deceleration). Therefore it is mandatory to set an appropriate start-up delay time (to the relay/output responsible for "underspeed" only). See section 7.2.9 "Start Up Mode" and "Start Up Relay".
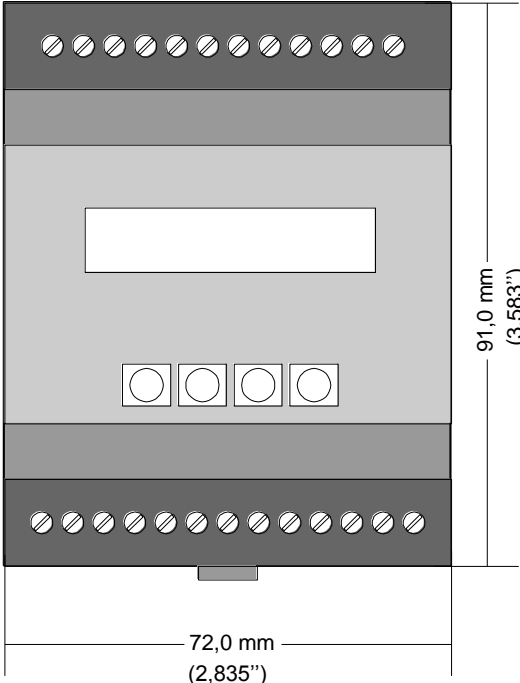
9.4.5. Setting of an appropriate Standstill definition

Under parameter "Standstill Time" an appropriate time must be set (see section 7.2.9).

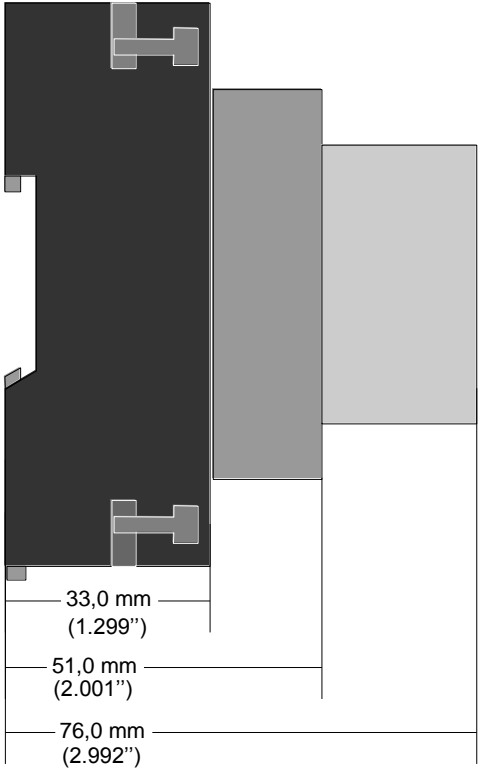---

- The command monitor uses always the same relay/transistor output to which the underspeed function has been assigned.
- It is important to set a time higher than the Start-up delay time!
- While the command monitor function is active, you can see an indicator box in the PI/PO column of the PC screen. The "Command Monitor" box shines blue when the motion command is in "Disable" state.

10.Dimensions:

91,0 mm
(3.583")

72,0 mm
(2,835")

Front view

33,0 mm
(1.299")

51,0 mm
(2.001")

76,0 mm
(2.992")

Side view

11. Technical Specifications

Power supply:	Input voltage: Protection circuit: Ripple: Consumption:	17 … 30 VDC reverse polarity protection $\leq$ 10 % at 24 VDC approx. 70 mA (unloaded)
Connections:	Connector type:	screw terminals, 1,5 mm² / AWG 14
Encoder supply:	Output voltage: Output current:	approx. 5.2 V max. 70 mA
Incremental input:	Signal levels: Characteristic (HTL): Internal resistance (HTL): Channels: Frequency:	RS422, differential voltage > 1 V TTL: LOW 0 … 0.5 V / HIGH: 3 … 5.3 V HTL: LOW 0 … 4 V / HIGH: 10 … 30 V NPN / PNP $R_i \approx 4.75$ kOhm A, /A, B, /B max. 1 MHz at RS422 and TTL symmetrical max. 350 kHz at HTL and TTL asymmetrical
Control inputs:	Number of inputs: Application: Signal levels: Internal resistance: min. time of dynamic signals: min. time of static signals:	2 inductive proximity switches or control commands LOW < 2.5 V, HIGH > 10 V (max.30 V), $R_i \approx 3.9$ kOhm 50 µs 2 ms
Analog output: (not with DZ267 and DZ269)	Voltage output: Current output: Resolution: Accuracy: Oscillation time:	-10 … +10 V / 0 … +10 V (max. 2 mA) 0 … 20 mA / 4 … 20 mA (burden: max. 270 Ohm) 14 bit ($\pm$13 bit) 0.1 % approx. 200 µs (reaction after 2 x sampling time + 200 µs)
Relay outputs: (only with DZ260 and DZ267)	Number of relays: Operating capacity: Reaction time:	3 potential free changeover contacts 30 VDC / 2 A or 115 VAC / 0.6 A or 230 VAC / 0.3 A approx. 4 ms
Transistor outputs: (not with DZ261 and DZ269)	Number of outputs: Signal levels: Output current: Protection: Reaction time:	3 5 … 30 VDC (depends on COM+ voltage), PNP max. 350 mA per output short circuit proof < 1 ms
Serial interface:	Format: Baud rate:	RS232 2400 … 38400 Baud
Display:	Type: Characteristic:	Background lightened LCD 2 lines, each 16 characters, 3,5 mm
Housing:	Material: Mounting: Dimensions (w x h x d): Protection class: Weight:	Plastic 35 mm top hat rail (according to EN 60715) 72 x 91 x 76 mm IP20 approx. 200 g
Temperature range:	Operation: Storage:	0 °C … +45 °C / +32 … +113 °F (not condensing) -25 °C … +70 °C / -13 … +158 °F (not condensing)
Failure rate:	MTBF in years:	23.4 a (long-term usage at 60 °C / 140 °F)
Conformity and standards:	EMC 2004/108/EC: LV 2006/95/EC: RoHS 2011/65/EU:	EN 61000-6-2, EN 61000-6-3, EN 61000-6-4 EN 61010-1 EN 50581