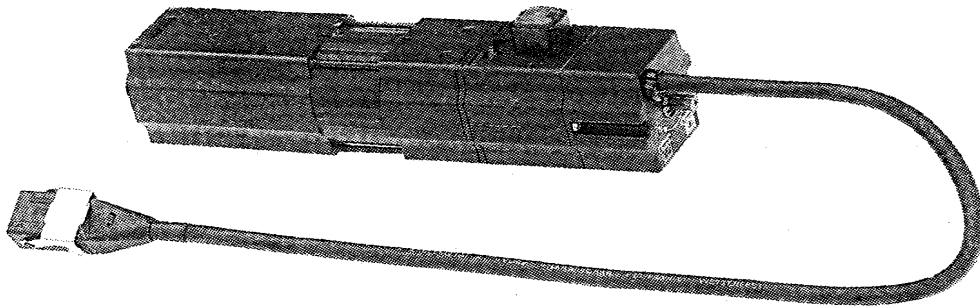


DMI Venetian blind drive



Technical documentation

Exploring
New Horizons





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1 General information

1.1 Type of motor

Functional section	Design
Motor	Single-phase – asynchronous with auxiliary condenser
Position transmitter	2 Hall effect sensors with rotor magnet
Brake	Noiseless hysteresis brake
Position resolution	Max. 1.68 degrees
Continuous operation time	Up to 20 min, depending on torque setting

Tab.1 Type of motor

1.2 Description of functionality

To allow you to achieve the highest level of functionality possible, many motor parameters (speed, pull capacity, operating mode, etc.) are directly accessible via a **Digital Motor Interface DMI**. The electronic coil control makes it possible to position the drive precisely. A hysteresis brake allows you to change the position almost noiselessly. The variable torque setting provides a certain amount of protection for the product.

Essentially, the drive can be operated with any standard commercially available locked awning sensor or with an intelligent control system. Each operating mode offers corresponding functions.

It is possible to include multiple motors in the circuit running in parallel. Specific types of feedback information from the group can nevertheless be used during controlled operating mode (position reached, torque overload, etc.).

1.3 Requirements for installation

The drive electronics work in a temperature range from -40°C to +125°C. This makes it possible to use the unit inside and outside with no problem (IP 44 protection level against splashed water). The drive is protected against overheating by a built in thermostat.

1.4 Accessories

DMI assembly cable for setting all enabled suspended material positions.
elero No.:

An interface converter for operating a drive with PC and the corresponding test software is available upon request for test purposes.

2 Definitions

The following definitions of terms apply to this operating manual:

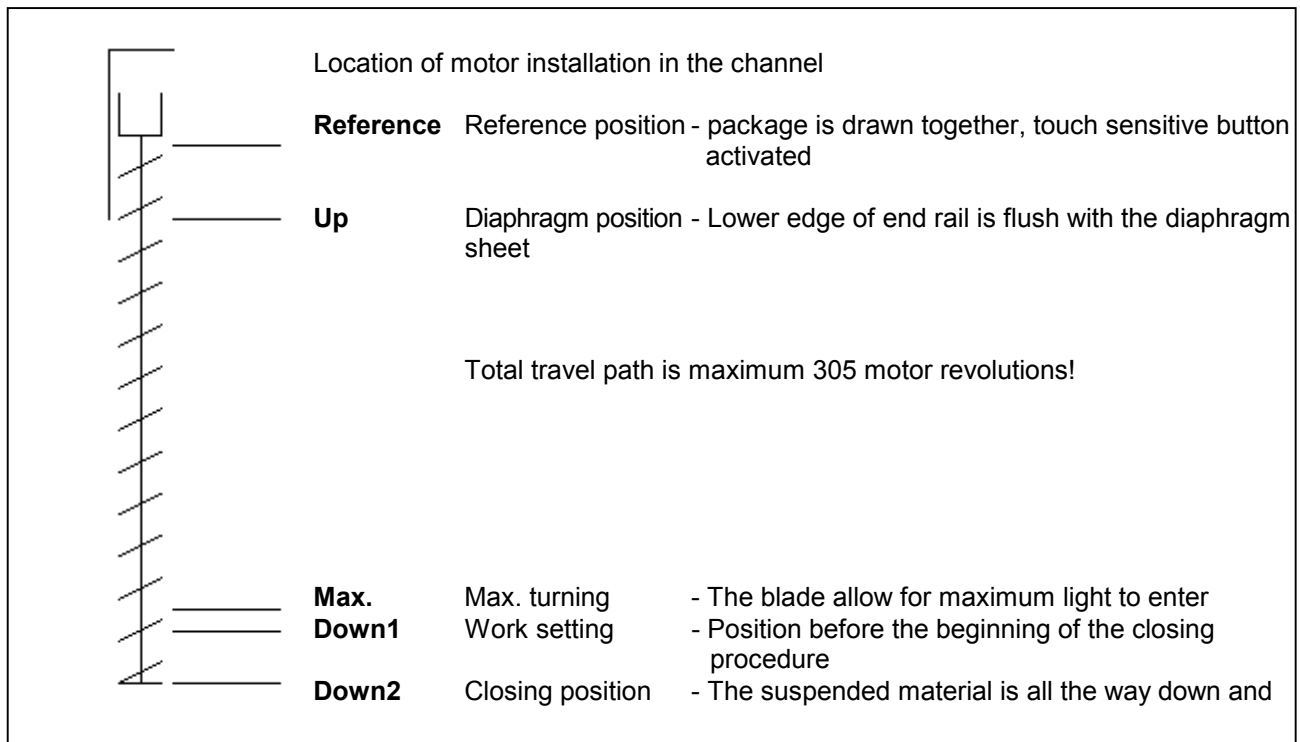


Fig.1 Definitions

For suspended material without a work setting, Down1 = Down2. The maximum turning can be determined as desired, but must not be more that 2048 impulses (9 revolutions) different from Down2.

- Torque** - Settings with this designation are associated with the motor torque.
- Rotation** - These parameters deal with speed monitoring.
- Motion** - Specification of motion (slow / fast)
- Delay** - The duration until the beginning of a function can be set.
- Cycles** - A cycle is complete with each change in rotational direction.



3 Design of the drive

Selection table for determining the drive:

Torque	Size of awning
3 Nm	3 m ²
6 Nm	6 m ²

Tab. 2 Tractive capacity

Basic information in table:

Blades flanged

Width per blade: 60 to 90 mm
 Diameter of belt reel: 30 mm
 Thickness of raiser 0.34 mm
 Weight (incl. fall rail): 3.0 kg/m²

3.1 Tractive forces of the drives

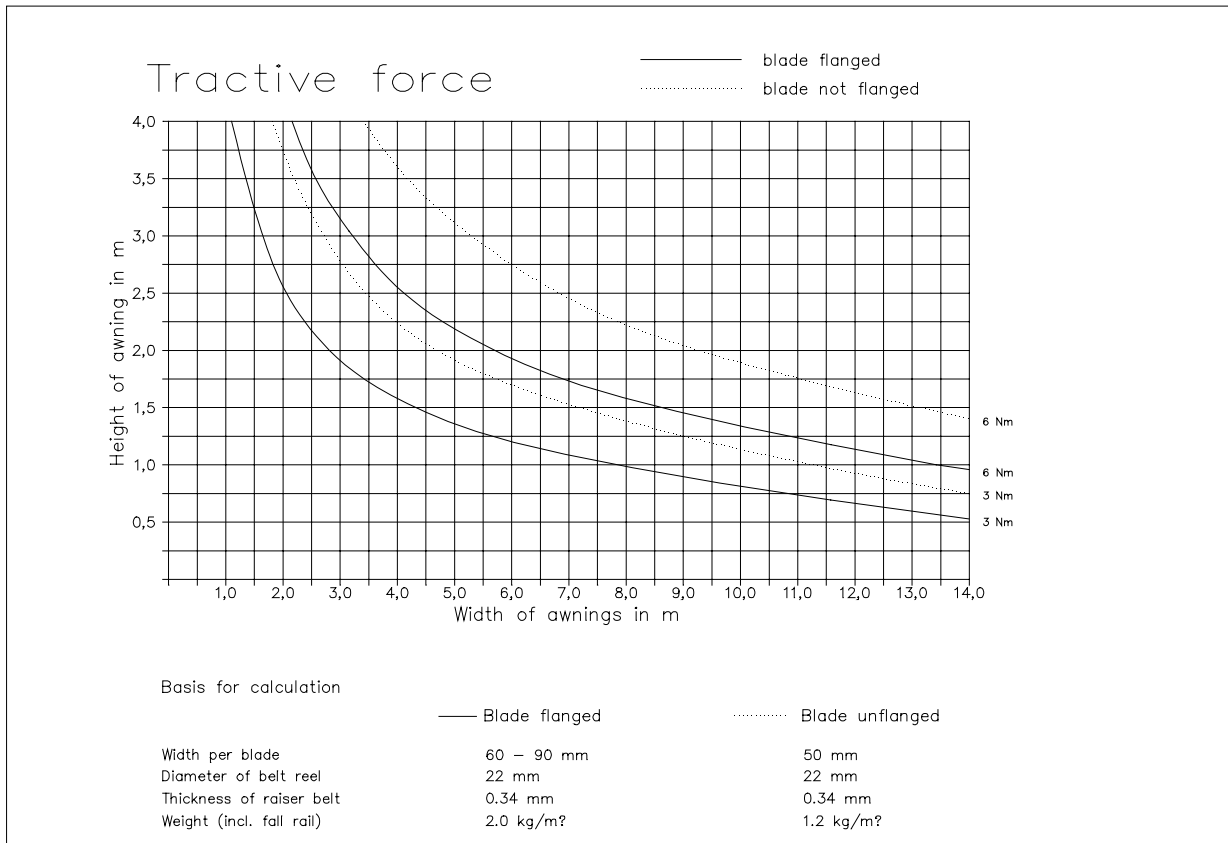


Fig. 2 Tractive force diagram

3.2 Switching off behaviour

Maximum tractive (pulling) forces as a function of the max. torque force:

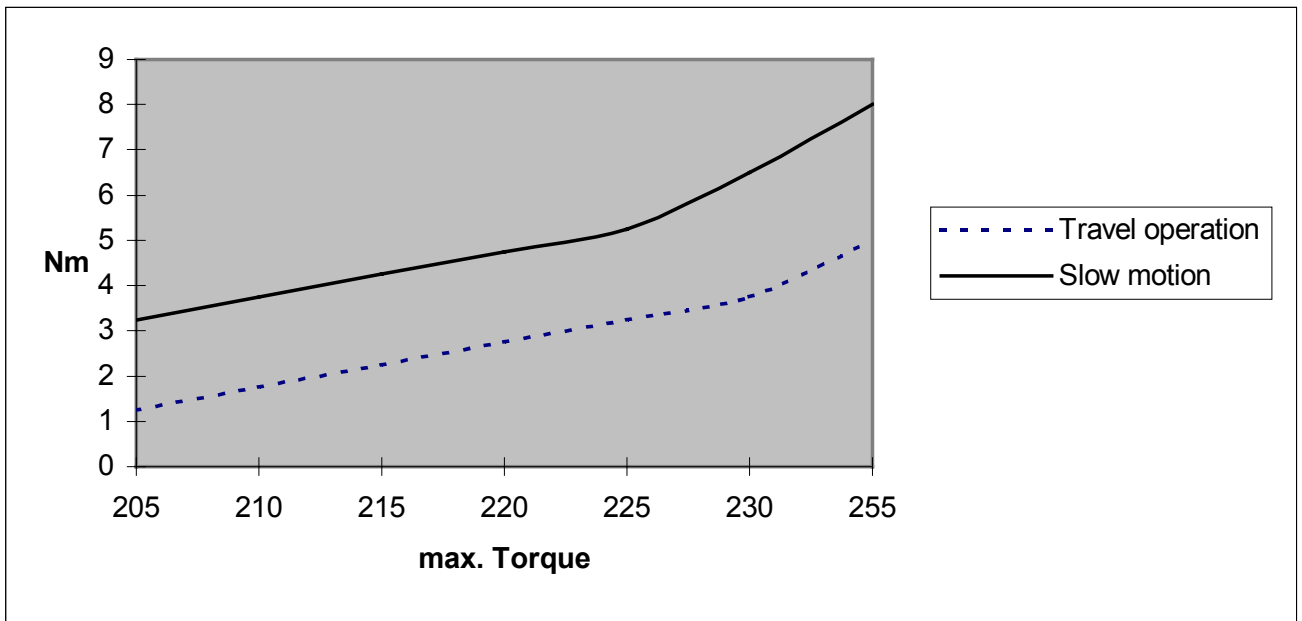


Fig. 3 Tractive forces



Note

The measured values refer to a power supply voltage of 230 V and an ambient temperature of 25° C. The switch-off forces depend on the voltage. With a voltage delta of 5 V a proportionate torque delta of 0.1 Nm is set. The thermal value is also a factor to be considered. It is subject to the changes in the friction values of the drive itself and of the suspended material that is being driven.

4 Dimensions

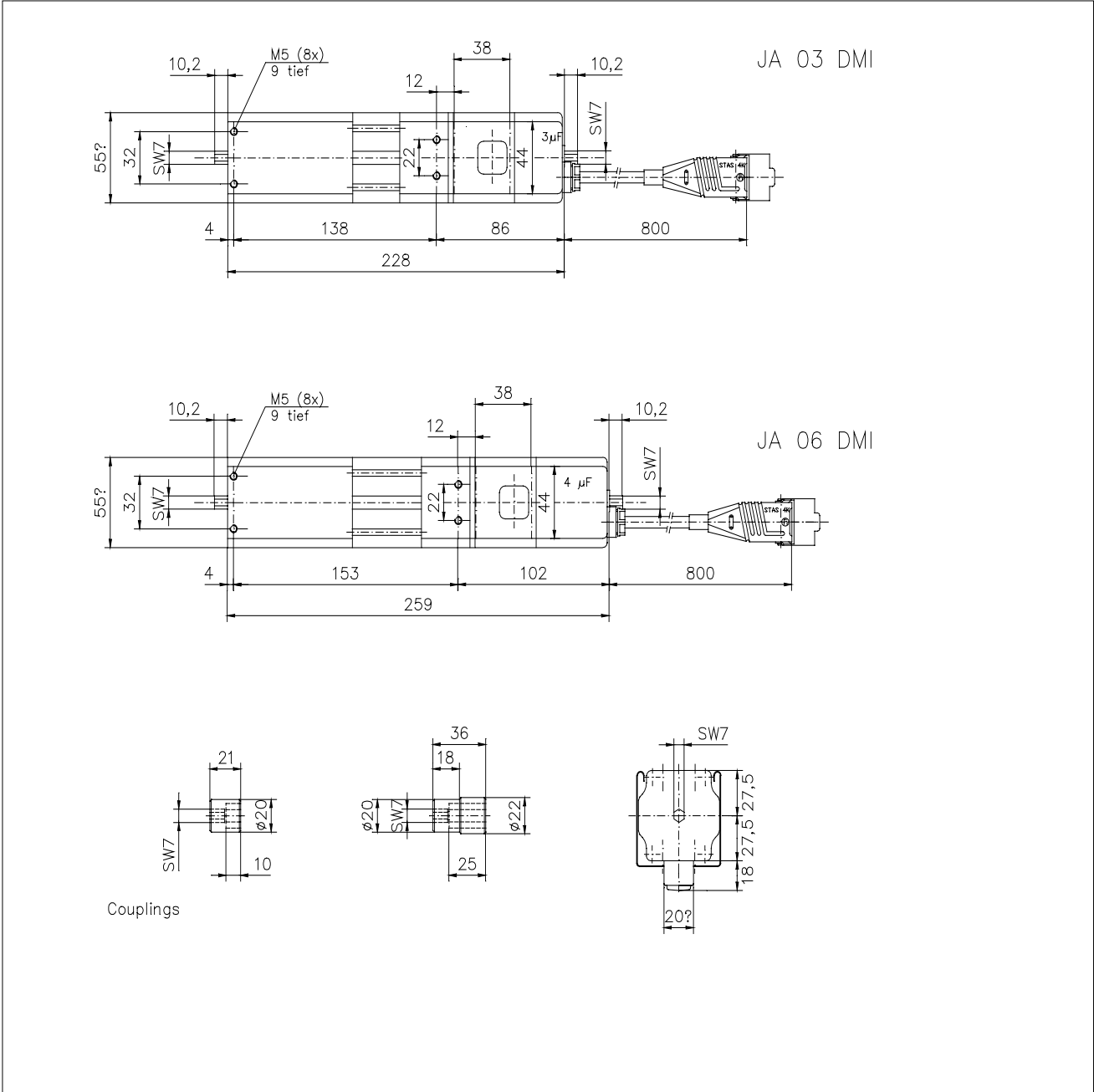


Fig. 4 JA dimensions



5 Technical data

Drive data	Unit	Drive type	
		JA 03 ¹⁾	JA 06
Torque	Nm	3	6
Limit switch range	Revolutions	305	305
Operating voltage	V	230	230
Mains frequency	Hz	50	50
Nominal current	A	0.50	0.65
Power draw while in motion	W	100	120
Power draw on standby	W	1.75	1.75
Power supply condenser	µF	1	1
Motor condenser	µF	3	4
Max. speed	rpm	2800 / 26	2800 / 26
Variable speed range	rpm	0.1 – 4.1	0.1 – 4.1
KB operating mode	min	6	5
Connector type		STAS4	STAS4
Length of cable	m	0.8	0.8
Cross section cable	mm	5 x 0.75	5 x 0.75
Protection type		IP 44	IP 44
Test symbol		-	-
Weight	Kg	1,5	

Tab. 3 Technical data

¹⁾ JA is the German abbreviation for awning (Jalousien)



6 Operating modes

Essentially there are two operating modes, manual (control by buttons, conventional controls) and communication.

After power is restored, the drive is in manual operating mode. After a valid command symbol with the correct parity is encountered (ASCII A-[), communication is active.

The only way to switch over into manual operation is after the power supply has been interrupted.

A number of manual operating functions are stored on the drive:

- Dead man
- Self hold
- Inverse self hold
- Automatic turning



Note

In general, motion in the upward or downward direction can always be stopped by activating the opposite direction key.

Each travel motion begins with the slow travel specified in Delay Slow. This makes it possible to convert the smallest switching times of a conventional relay control into individual steps of the drive. For longer switching, the drive runs at rapid speed as long as the relay is closed.

Automatic turning can be combined with the operating modes Self Hold and Inverse Self Hold. After reaching Down2, the drive moves to Position Max.

Different durations of activation of a travel direction key result in different travel functions. With the Impulse function, the drive runs as long as a key is being pressed:

Keys pressed	Drive response based on operating mode			
	Dead man	Self hold	Inverse self hold	Automatic turning
DOWN short	DOWN impulse	DOWN Impulse	Approach Down1	
DOWN long	DOWN impulse	Approach Down1	DOWN impulse	
2x DOWN short	2x DOWN impulse	2x DOWN impulse	DOWN to Down2	DOWN to Down2 then Max
DOWN long + DOWN	2x DOWN impulse	DOWN to Down2	DOWN impulse /approach Down1	DOWN to Down2 then Max
UP short	UP impulse	UP impulse	UP to Up	
UP long	UP impulse	UP to Up	UP impulse	

Tab. 4 Operating modes

The limit value for evaluating the keystroke as short or long is specified by the Delay Fixed configuration tab. The value entered there is multiplied by 20 ms to yield the length of time until Self Hold or until impulse output in the case of inverse operating mode.

The system switches from slow travel to rapid travel when there is a keystroke delay longer than what is defined in Delay Slow. Here as well, the numeric value that is entered is multiplied by 20 ms.

The measurement tolerance for the time to press the key is 104.66 µs. This ensures equal recognition of the duration for pressing the key for group switching.

7 Connection

7.1 Connector assignment

The drive comes complete with a sprayed Hirschmann STAS4 connector.

- PE - Protective earth wire
- N - Neutral line
- L - Phase
- B - RXD data line 230 V-secure (drive receives in communication operating mode)
- A - TXD data line 230 V-secure (drive transmits in communication operating mode)

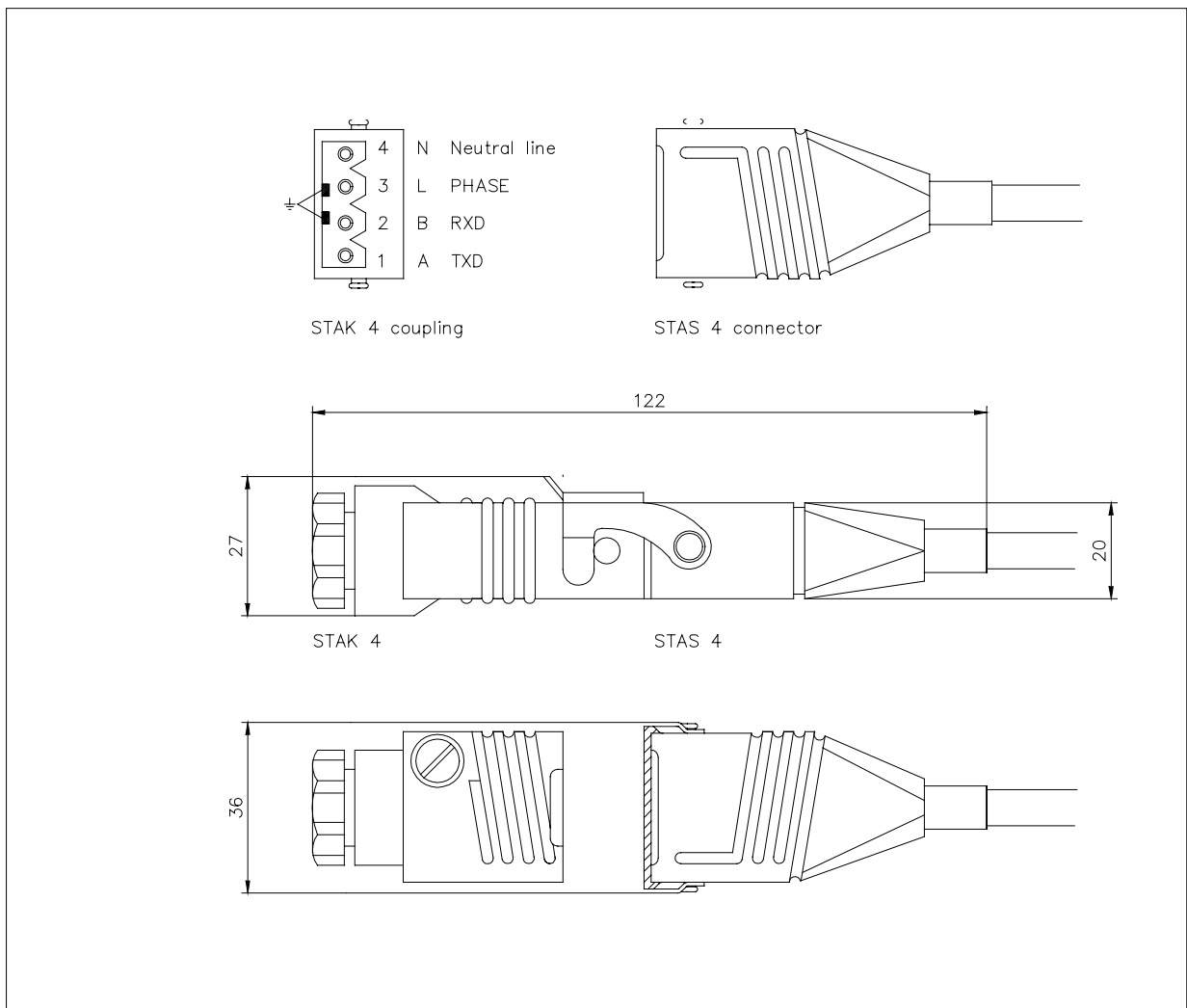


Fig. 5 Connector assignment

7.2 Connection for button operation

Activation via button (L on control line A / B) suitable for:

- Individual drives with button
- Simple group controls
- Operation on conventional sun protection systems



Note

The operating modes specified in the operating tab apply (Dead man, etc.). The amount of time until Self Hold or until switching into rapid travel is determined in Delay Fixed and Delay Slow respectively.

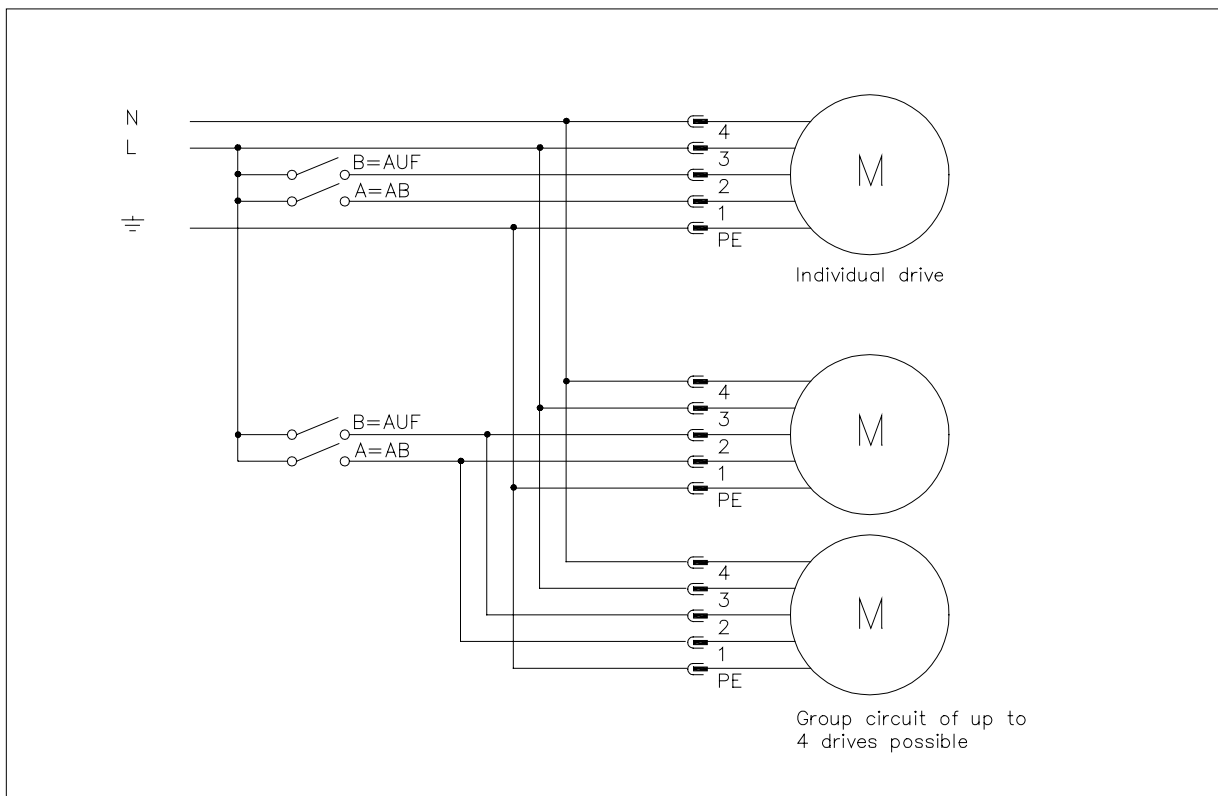


Fig. 6 Connection diagram for operation by button

7.3 Connection for individual operation with control

Direct activation by means of motor commands. All functions of the drives can be used to full extent.

- Blade positioning
- Feedback reporting operating and error states
- Drive can be configured in any manner

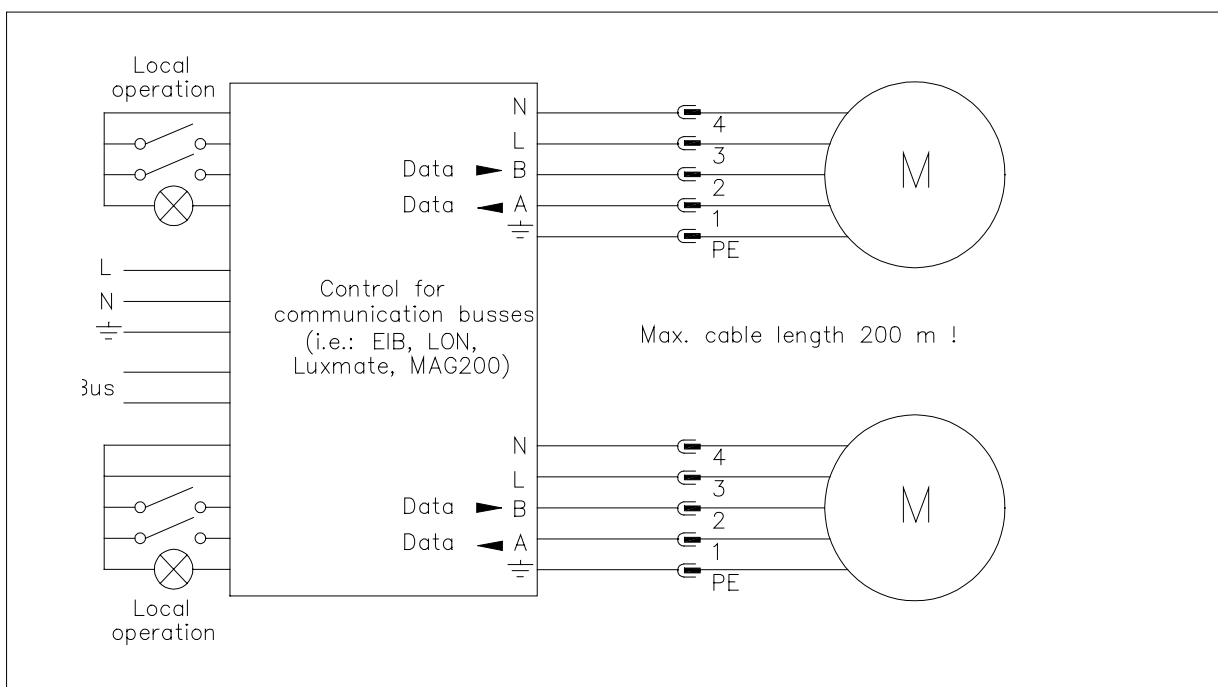


Fig. 7 Connection diagram for individual operating mode with control

7.4 Connection for group operation with control

Direct activation by means of motor commands.

- Multiple drives in parallel possible with the same function (max. 4).
- Shared blade positioning.
- Conditioned feedback messages of operating and error states.
- Drive group can be configured in any manner in common.

The following points should be observed for a parallel circuit:

Total cable length	Max. 200 m
Cross section of line	Min. 1.5 mm ²
Number of parallel drives in the circuit	1-4
Current per drive	Max. 1 A

The % control signals are particularly suitable for activation. This makes it possible to use and position drives together in a precise manner even if they have differing heights.

Note
 ! When evaluating the motor status data, no parity or checksum must be tested. These may be invalid for the various states of the drives.

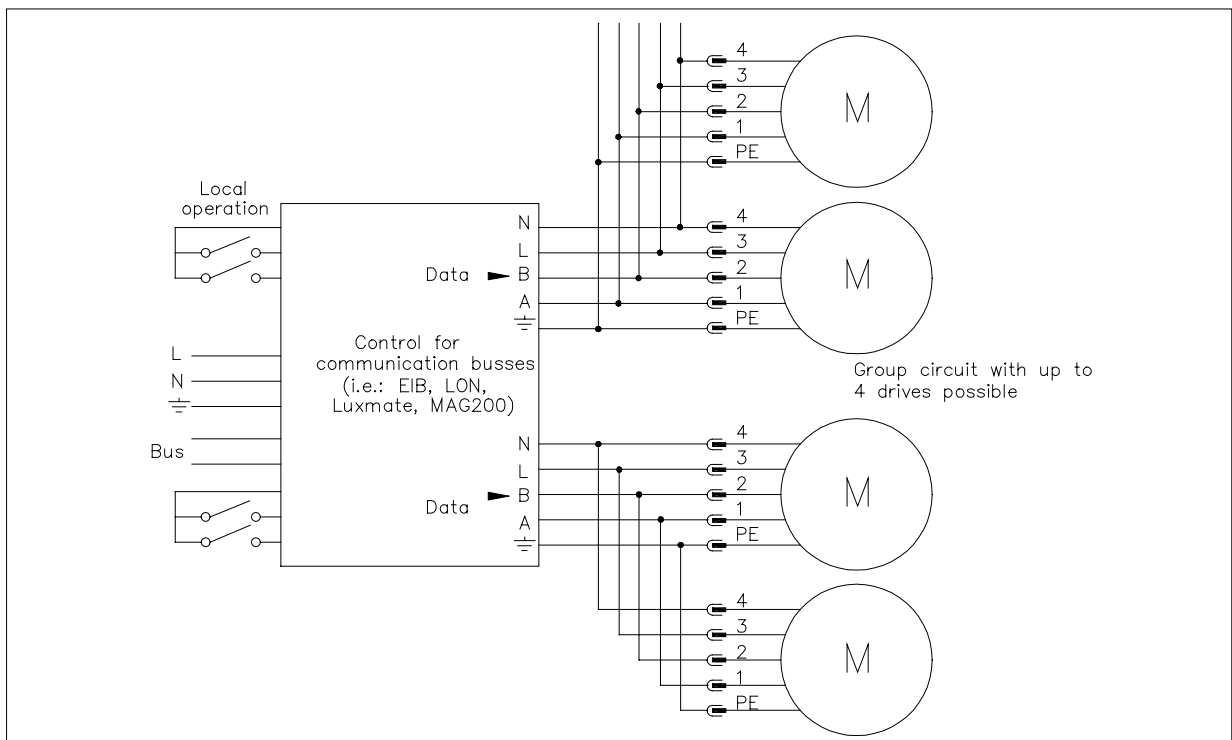


Fig.8 Connection for group operating mode with control

8 Initial commissioning

8.1 Position setting with manual cable

Programming sequence to create all positions:

1. To change into programming mode, move to the upper quarter of the suspended material. **Turn the power supply off and back on again!**

2. Pressing both keys simultaneously (> 5 sec.) after the power is restored switches the drive into programming mode. This is indicated by a brief automatic motion up and down.



! Every **Position that is saved** takes place by pressing the key twice. (> 1sec.)

3. Travel upward to the reference key by pressing the **white** key. The drive is now ready for a position to be entered.



Downward direction by activating the **black** key

- 4. Travel down to Position Down1 -> Position saved (key pressed twice > 1 sec.)
- 5. Travel down to Position Down2 -> Position saved



Upward direction by activating the **white** key

- 6. Travel up maximum turning position -> Position saved
- 7. Travel up, diaphragm position -> Position saved
- 8. Travel up to reference button -> Automatic end of programming mode

Positions that are **not** required can be jumped over by pressing the key twice again at the current position.

If no position has been saved within 10 minutes, the drive goes back into normal mode without modifying its position values.

During programming mode, the drive is automatically in dead man operation independently of the operating mode set in Operate. When switching from Slow to Rapid travel, the drive makes a slight pause so that programming mode will be more readily recognised. If the bit for limited position programming is set, only diaphragm correction is possible.

8.2 Position correction for diaphragm

Programming sequence to correct the diaphragm position:

1. To change into programming mode, move to the upper quarter of the suspended material.

Turn the power supply off and then back on!

2. Activating both drives simultaneously (> 5 sec.) after the power has come back on switches the drive back into programming mode. This is indicated by a brief automatic motion up and down.



! Each **saving of a position** is performed by pressing the key twice (> 1sec.).

3. Upward travel to the reference button by pressing the **white** button. The drive is now ready for position entry.



Downward direction by activating the **black** key

4. Travel down to the desired diaphragm position -> positions is stored (press the key twice)



Upward direction by activating the **white** key.

5. Travel upward to reference button -> Automatic end of programming mode

If no position has been stored within 10 minutes, the drive goes back into normal mode without changing its position values.

During programming mode, the drive is automatically in dead man operation independently of the operating mode set in Operate. When switching from Slow to Rapid travel, the drive makes a slight pause so that programming mode will be more readily recognised.



9 Factory commissioning

9.1 Delivery status

The drive is pre-configured for factory commissioning (installation in the lower limit setting of the suspended material and subsequent travel upward to the touch sensitive button). The values recorded in Data for converting Down1 and Max are deleted after the touch sensitive button is reached. The information in Torque Range is set as the diaphragm position Up and Torque Range is automatically set to Down2.

Manual operation is specified with Self Hold in Operate. A reference trip after the power supply is connected does not take place until after the first travel command. When the torque is shut off, the force applied is automatically relaxed. All positions are enabled for correction by means of the manual cable.

The motor parameters contain the following values upon delivery:

Motor Parameter	Value	Factor / Reference
Position UP	200	Impulses
Position Down1	65535	Impulses
Position Down2	65535	Impulses
Position Max	65535	Impulses
Operate	2	Self Hold
Maximum Torque	255	Max. Force
Torque Range	150	Number of impulses to determine diaphragm
Slow Motion	255	About 4 rpm
Delay Fixed	100	x 20ms
Delay Slow	100	x 20ms
Data	12850	50 impulses each for automatic calculation Down1 / Pos. max
Date	For example 1099	Current month / year
Cycles	0	
Error Cycles	0	

Tab. 5 Status upon delivery



9.2 Position setting for factory installation

The drive can be configured by entering the value 65535 at Position Down2 and then removing the power supply to find the position automatically. When the unit is delivered, this value is already in Down2.

The values found in Data determine the corrections for Position Down1 and Position Max. The desired diaphragm value must be present in Torque Range.

Procedure:

1. Bring the suspended material to the lowest limit.
2. Install the motor.
3. Raise the suspended material until the drive is turned off by activation of the reference button.

During the trip in upward motion, motion in a downward direction up to the original point is possible at any time.

After the touch sensitive button has been reached, the result is following values:

Position Down2 contains the measured distance travelled.

Position Down1 is calculated on the basis of Position Down2 - Data_SO.

Position Max is calculated on the basis of Position Down1 - Data_MO.

Position Up has taken on the defined value from Torque Range.

Torque Range is automatically set to Down2.

Data shows 0 and is free to be used again.



Note

If the user begins programming with manual cable before a factory commissioning has taken place, the factory commissioning is automatically concluded.



10 Error evaluation

To facilitate meaningful error diagnostics, incorporating a PC directly into the circuit with an interface converter will be advantageous.

Manifestation of error	Measures / Cause
The drive starts running automatically after the current is attached.	Control lines A and B may be mixed up. Check the control system.
The drive does not start running from above or only hums in upward direction.	The button sensor is mechanically defective or cannot be correctly activated by the suspended material.
The drive only starts running briefly from above and then stops.	The button sensor is not opening mechanically or is frozen.
The drive does not show any response.	Check the touch sensitive button. Establish communication with the PC and check the configuration.
The percentage positions are invalid.	Check the position values. Up must be less than Down1 and Down1 must be less than or equal to Down2. Position Max must be no more than 2048 less than Down2.
The drive will only run jerkily in either direction and returns in slow motion.	Check the torque configuration. Max. Torque must be at least 210.
The drive only moves in slow motion.	The torque value is too small.
The drive moves upward and then automatically to the desired position.	Reference trip is absolutely mandatory. It has been started automatically.
The drive moves higher than the set diaphragm position and then backward from above.	The drive has performed a reference trip.
After a several trips, no more functionality is available.	Temperature monitoring has engaged. Allow the motor to cool off.

Tab. 6 Error evaluation



11 General information

11.1 Functional description

The **Digital Motor Interface DMI** allows for direct access to a complete range of motor parameters. The drive can also be operated by means of a conventional activation system. A number of operating modes are available to the user, thus there is a sort of motor control device in the drive for operation on a commercially available locked button.

The interface works with every ASCII code (RS232). It is not necessary to convert the signal level. The interface can be used with cable lengths of up to 200 m with a high signal level and a moderate transmission rate. The transmitter or receiver lines are mains power-secure. They cannot be destroyed by being connected incorrectly. Parity query, a limited ASCII command set and double transmission of action commands ensure problem-free transmission of data.

11.2 Interface structure

Parameter	Value
Data transmission	Serial, asynchronous (RS 232)
Signal level	42 V, with mains power
Transmission rate	1200 Baud
Configuration	1 start bit, uneven parity, 1 stop bit Optional additional checksum byte
Compatibility	UART's, ASCII character transmission

Tab. 7 Interface structure

11.3 Description of functionality

The potential of the arriving signals are queries every 104.66 μ s. This yields 8 read values for each data bit. Only the query value 4-7 is evaluated. If less than 2 of the levels are detected as logical 1, the received character is considered as a logical 0.

After an ASCII character with the correct parity has been received, the drive transmits the received or the required character back. A command always consists of three characters:

1. Command (A - [)
2. Parameter high byte (0 - 255)
3. Parameter low byte (0 - 255)

These can be transmitted immediately one after the other. With a time offset of 1 ASCII character, the drive answers by repeating the command character and then the current parameters. Immediately after the last parameter, the drive transmits an 8-bit check sum that is derived by adding together the command, the high byte and the low byte. The first character received must be in the range from A to [. If this is not the case, it will be ignored by the drive.

After 120 ms without data, the query begins automatically with the command character.

To initiate an action on the drive, a complete command block must be transmitted identically twice in a row (2x). This must take place within 120 ms.

After the first transmission is received, the drive transmits its data back to the selected storage location. After the second transmission is received, it repeats the received data and writes it immediately to its storage unit.

Every valid character with the correct parity immediately switches the drive into communication mode.

12 Hardware

The two data lines A and B are designed for direct activation with 230 V. When manual operation is detected, the transistor switches the signal through to the query point so as to place a load on input B.

The earth potential is 42 V less than N. Thus the increase in voltage for communication operation is likewise about 42 V.

The pre-resistors in transmission line A are selected so that a current of about 8 mA can flow. This ensures that the ramp is sufficiently steep and that the length of the cable can be up to 200 m.



Note

To avoid unnecessary power dissipation, manual travel commands should not be present for extended periods. (Use the button, use command time with control devices).

Circuit diagram on the drive, inputs A and B:

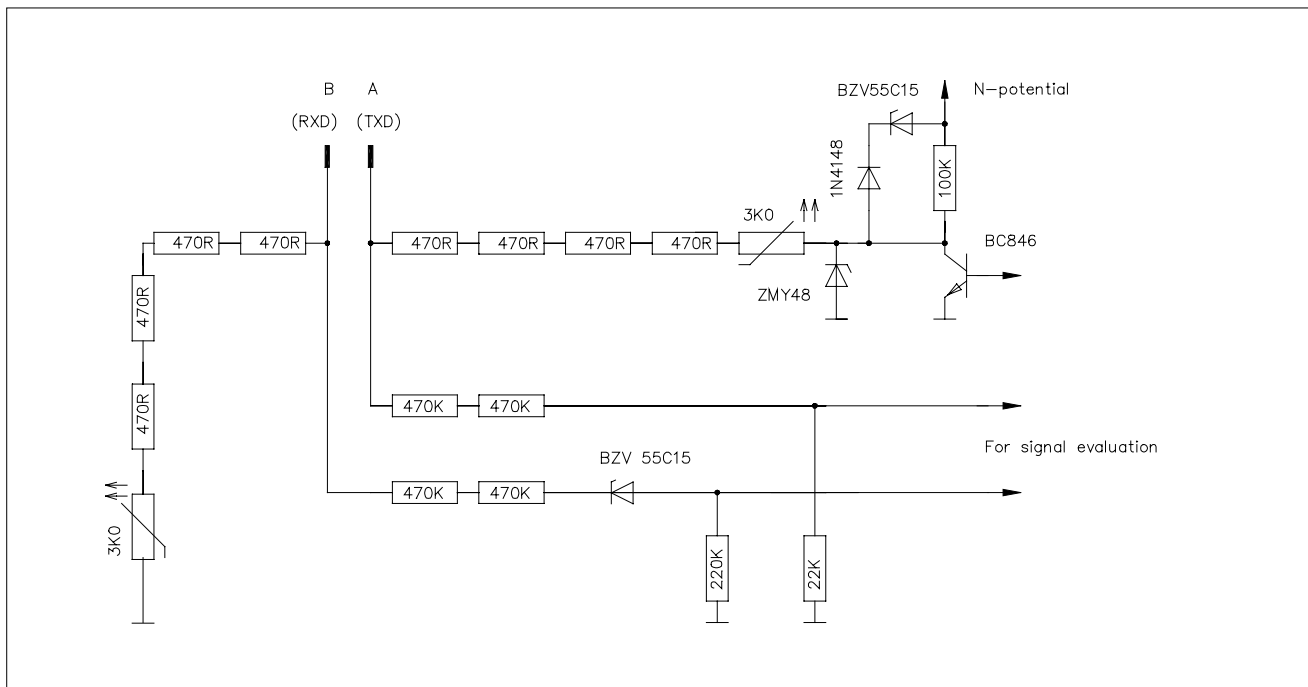


Fig. 8 Hardware circuitry

13 Activation

The drive can drive an opto-coupler directly. A maximum of 8 mA is available.



Note:

The total length of the line for operating a drive or a drive group must not exceed **200 m**. A maximum of 4 drives are possible in parallel.

Sample circuit diagram of an interface converter for connecting the drive directly to a PC.

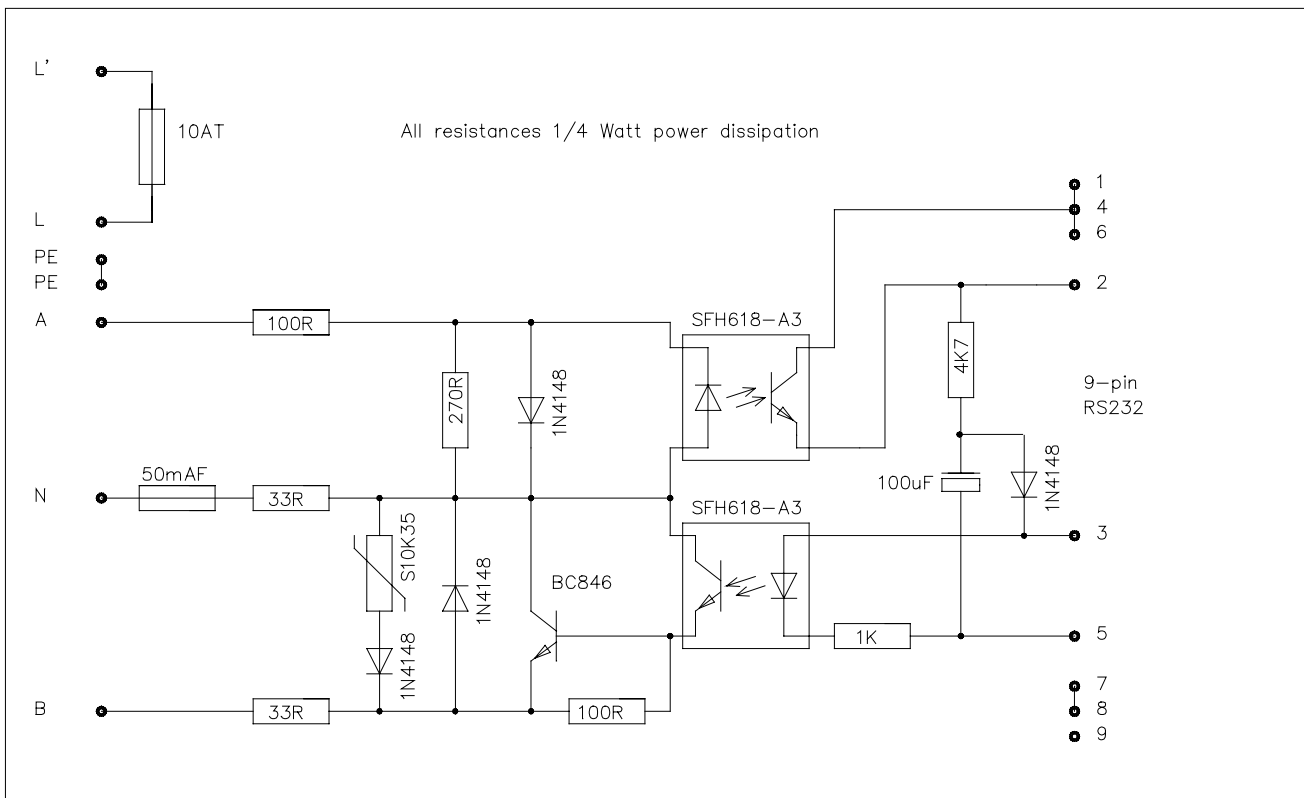


Fig. 9 Interface converter hardware



14 Command set

14.1 Travel commands

All travel commands must be transmitted 2x one after the other.

.

14.1.1 Direct travel commands (code A - F)

Travel commands that are executed immediately and which delete all previous commands.

A - Stop

All motion is stopped. The Finished Flag is set.

B - Reference

The reference trip is introduced immediately and regardless of current motions.

To avoid drift from the position counting, the drive automatically starts a reference trip after 255 cycles. The command that is currently still valid is stored and is then resumed after the touch-sensitive button has been approached.

When the touch-sensitive button has been reached within a valid position window, the reference flag is set.

C - Up

Moves to the diaphragm position. Depending on the status of the counter status of the cycles remaining until reference trip (Next Reference), this command is converted into a reference command. After the button is reached, the drive runs from **above** to the saved diaphragm position. The Up Flag indicates that the position has been reached.

D - Down2

Approach closing position. Reaching Down2 Position or all greater position values set the Down2 Flag.

The parameters contain the absolute (max. 32768) or relative position. The maximum travel distance for these commands is limited to 152 motor revolutions.

E - Go_Pos_Slow

The position is approached at slow speed as defined by Slow Motion. If bit 15 is set, the drive travels to the transmitted value (max. 16384) relative to the current Position. Bit 14 determines the direction (Reset = Up, Set =Down).

F - Go_Pos_Fast

The position is approached at rapid speed. Shortly before reaching the target value, the drive switches into slow travel. If bit 15 is set, the drive travels to the transmitted value (max. 16384) relative to the current position. Bit 14 determines the direction (Reset = Up, Set =Down).



14.1.2 Buffered travel commands (code G - J)

If the drive still performs a command, the newly received one is stored in a command buffer. This buffer can hold as many as 4 commands. Thus a total of 5 commands can be processed automatically one after the other.

If commands input exceeds this storage capacity, **Buffer** (i.e. buffer overflow) is placed in the malfunction status.

Processing is based on the first in, first out principle. After the position is reached, the storage location is deleted, as is the overflow bit.

G - Down1

Approaching the work setting. The stored Position Down1 can be approached from below or from above.

If the position is correct, the Down1 Flag shows 1.

Relative travel commands

The parameters contain the position as a percentage (max. 255). This refers to the value stored in Down2 minus the diaphragm position.

Command information greater than 255 is invalid. The error bit Parameter indicates the non-permitted value.

H - Go_Pos_Slow%

Position is approached at slow speed as defined by Slow Motion.

I - Go_Pos_Fast%

Position is approached at rapid speed. Shortly before the target value is reached, the drive switches over into slow travel.

J - Go_Tilt%

Position is approached at slow speed as defined by Slow Motion.

Note

- ! A % portion of the travel distance is calculated from $\text{Down2} - \text{Up} / 255$.
The reference that applies for a turning is always the current position after a travel command has been completed. Down2 applies as a reference for a position greater than or equal to Down1.
The drive calculates the maximum turning path by subtracting the position of the maximum value from the Down2 Position. The turning path can then be divided up into 0..255.



14.2 Position commands (code K - N)

If these commands are invoked one time with any parameter set the drive transmits the content of the desired storage location.

Invoking the same code identically two times in a row causes the drive to transmit the current value to the storage location after the first code. After the second code is received, the drive takes on the values present in the parameter and transmits them back to the storage unit.

K - Position UP

The number of impulses for the diaphragm position.

L - Position Down1

The number of impulses for the work setting.

M - Position Down2

The number of impulses for the closing position. The position value is at the same time the absolute end of the travel path. For Go_Pos_Fast commands with a large parameter, the drive approaches Down2. The malfunction bit Parameter indicates an invalid value.

After the power has been restored, multiple trips away (<8 trips) up to one half of the stored Down2 Position are possible for assembly purposes without previously approaching the touch-sensitive button.

N - Position Max

The number of impulses for the maximum turning position. The value defines the number of impulses for the maximum meaningful turning angle starting from Down2. The difference in the number of impulses between Position Down2 and Position Max is taken as the basis for calculating the percentage of the turning position for Go-Tilt%.



Note

Position Max must be no more than 2048 counter values less than Down2.



14.3 Configuration commands

14.3.1 Manual operating modes (code O)

O - Operate

Bit 0 -Dead man

- (1) After the key is pressed, motion begins at the speed defined by Slow Motion. After the period of time specified by Delay Slow has elapsed, the drive switches into rapid travel. Releasing the key stops the drive.

Bit 1 - Self holding

- (2) Pressing key begins the motion at the slow speed defined by Slow Motion. After the period of time defined by Delay Slow has elapsed, the drive switches into rapid travel.
If the key is released within the amount of time specified in Delay Fixed, the drive goes into Self Hold. Releasing the key before the Self Hold time stops the drive. After that the drive can be stopped by pressing on the opposite direction button. Down1 can be approached by pressing the DOWN key for a long time. Pressing the DOWN key for a long time and DOWN causes the drive to approach Down 2.

Bit 2 - Inverse self holding

- (4) Pressing key begins the motion at the slow speed defined by Slow Motion. After the period of time defined by Delay Slow has elapsed, the drive switches into rapid travel.
If the key is released within the amount of time specified in Delay Fixed, the drive goes into Self Hold. After that the drive can be stopped by pressing on the opposite direction button. Down1 can be approached by pressing the DOWN key briefly. This is possible in both directions.
Pressing the DOWN key briefly 2x causes the drive to approach Down 2.

Bit 3 - DMA – operation

- (8) If the bit is set, reference position comparison is turned off. The drive can run between the touch-sensitive button and the torque switch-off without position settings. This can be combined with the manual operating modes above.

Bit 4 - Automatic turning

- (16) The combination with the manual operating mode Self Hold or Inverse Self Hold causes the drive to perform a turn to Position Max after Down2 is reached if the bit is set and Doan direction is activated twice.



-
- Bit 6 - Precise reference trip**
(64) If the bit is set, the drive runs at reduced slow speed to the touch sensitive button.
- Bit 7 - Immediate reference trip with command after power is restored**
(128) When the first travel command is received, the drive immediately performs a reference trip after power is restored.
- Bit 8 - No free travel after overload switch off**
(256) After a switch-off because of torque overload (Up or Down) the drive moves away from the detected obstruction in slow motion.
If the bit is set, no free travel will take place.
- Bit 9 - No full position programming with manual cable**
(512) If a manual cable is being used, it is possible to change all position values.
If the bit is set, only the diaphragm position can be corrected by means of the manual cable.
- Bit 10 - No torque switch-off**
(1024) If the bit is set, torque switch-off is not active. The drive only switches off if it is forced to come to a complete standstill.
- Bit 11 - No checksum**
(2048) If the bit is set the drive does not return any checksum byte when its storage values are queried. Communication consists only of the command, the high byte parameter and the low byte parameter.
- Bit 12 - No mandatory rapid travel with reference after power is lost**
(4096) If the bit is set the drive uses its position stored before power was lost as the basis for positioning after power is restored. Briefly before reaching Position 0 (proximity of the touch sensitive button) the drive switches into slow motion.
- Bit 13 - No reference trip counting**
(8192) The drive uses the internal reference compensation only after the power is restored.
- Bit 14 - Programming OK**
(16384) After complete manual position programming or after a factory commissioning, the drive sets this bit to recognise parameter sets. This bit can be reset through an interruption of the manual programming mode (Power Off/On) or as a result of communication.
- Bit 15 - Reference assignment**
(32768) If the bit is set, the next reference impulse after the touch sensitive button is approached is set as a new reference. After a reversal in the direction of rotation, the value is accepted and the bit is automatically deleted.
-



14.3.3 User data (code P - U)

P - Max. Torque (0 - 255 high byte)

The smaller the value stored in the high byte, the weaker the drive is in its total tractive force. For values below 210, the nominal speed is only reached in idle mode as a rule.

Q - Torque Range (0 - 65535)

To ensure closing with an increased amount of force expended, for example, a range can be defined in which torque detection is active (active from reference up to the position entered).

R - Slow Motion (0 - 255 low byte)

The value 255 must be selected to achieve maximum slow travel.
The smaller the value, the slower the motion.

Brake Distance (0 - 255 high byte)

The number of impulses after which the drive will switch over into slow motion before reaching the end point.

S - Delay Slow (0 - 255 low byte)

The amount of time before the drive switches into rapid travel in manual operating mode can be configured. The basic time unit is 20 ms. Depending on the value, the drive switches into rapid motion after this amount of time.

Delay Fixed (0 - 255 high byte)

The amount of time before Self Hold can be set. The basic time unit is 20 ms. Depending on the value, the drive switches into Self Hold after this amount of time.

T - Data (0 - 65535)

The motor data can be used by the user in any manner at all.

The following apply for a desired initial commissioning in suspended material production:
Subtraction value for Position Down1 (0-255 low byte Down2 - Value = Down1)
Subtraction value for Position Max (0-255 high byte Down2 - Value = Pos. Max)
The data is deleted after the commissioning is completed (approach to touch sensitive button).

U - Date (0 - 65535)

When the drive leaves the factory, the month and year of production appear here (for example 1098).

The commissioning data of the system can be stored here if desired.



14.4 Query commands

11.4.1 Current motor data (code V - Z)

All motor data can now be read.

V - Cycles

The current number of travel cycles performed. With every desired change in direction, a counter is incremented here. The maximum value is reached at 65535.

W - Error Cycles

The current number of travel cycles with malfunction. Every time the torque value is exceeded, there is an invalid reference, etc. a counter is incremented here. The maximum value is reached at 65535.

X - Curr. Position

The current position is transmitted upon request.

Y - Curr. Position% (high byte)

The current position is converted into a percentage value that falls in the range of 0-255. This can be used as a feedback message to the percentage travel commands. The following applies for calculating the distance:

$$1\% = (\text{Position Down} - \text{Position Up}) / 255$$



Note

With less than 255 portion possibilities, two or more of the percentages correspond to the same absolute position.

Curr. Rotation (low byte)

The current speed ($\times 0.52 \text{ ms} = \text{time per rotor rotation in seconds}$) is available for all rapid travel. In idle mode, the result is 41 (2810 rpm), and in slow travel mode, the value reaches 255. At standstill it is 0.

Z - Ref. Position (high byte)

After a new setting, the number of impulses of the distance between the touch sensitive button and the shaft reference is stored here. This makes it possible to calculate an absolute difference in position after the valid approach of the reference button within one rotation of the drive shaft.

Next Reference (low byte)

The number of trips remaining until reference is absolutely mandatory.



14.4.2 Motor status messages (code [])

[- Status

The status data that is transmitted back should be evaluated without a test for parity. In the case of a parallel circuit and differing values, the parity does not return a valid value.

All **Message bits** (bit 0 – bit 6) are **active high**. Thus a message is only generated in the case of a parallel circuit if the requirement is satisfied for all the bits.

Bit 0 -Reference

Reference reached, touch sensitive button is pressed.

Bit 1 -Up

Diaphragm position reached, drive is at number of impulses Position Up.

Bit 2 -Down1

Work position reached, drive is at number of impulses Position Down1.

Bit 3 -Down2

Closing position drive is at number of impulses Position Down2 or lower.

Bit 4 -Max

Maximum turning position reached, drive is at number of impulses Position Max.

Bit 5 -Position OK

The target position is reached and the drive is at the target position. The position buffer to be processed is empty and no more buffered reference commands are present.

Bit 6 -Finished

The drive is stopped and has no more buffered commands to process.



14.4.3 Motor status malfunctions (code [])

All **malfunction bits** are **active low**. For group circuits, the drive with the malfunction always filters through. In addition, they are buffered (stored in memory) until they are retrieved.

Bit 7 - Move Reference

The drive has corrected a travel command into a reference travel command and is currently performing this reference trip.

Bit 8 -Buffer

Command buffer overflow. One command is currently being processed and an additional four are stored.

Bit 9 -Invalid Reference

Reference invalid. The current value is too large to be corrected. To find a valid reference more quickly, the number of trip counters will be reduced.

Bit 10 - Torque Up

Torque overload in the up direction. The defined maximum speed was exceeded during an upward motion.

Bit 11- Torque Down

Torque overload in the down direction. The defined maximum speed was exceeded during a downward motion.

Bit 12 - Mechanical

The drive is unable to rotate. Overload thermostat or mechanical defect.

Bit 13 - Communication

Malfunction in communication. A transmission resulted in an invalid character (not A-Z) or the parity of the data did not agree. The bit will be deleted after a correct status query.

Bit 14 - Parameter

An unreliable parameter was entered (a percentage value not within 0..255, target position greater than Down2). The bit will be deleted after a correct status query.

Bit 15 - Critical Reference

There are still < 8 trips remaining until the drive performs an automatic reference trip.



15 Constant definitions

Constants	Unit	Value	Remark
Number of trips until reference required		255	
Number of trips until reference is required after invalid approach to touch sensitive button (button was reached too early)		63	
Automatic conversion of Up command to reference command		< 50	
Maximum permissible reference deviation	Degrees	50	
Communication reset	ms	140	
Minimum duration of double keystroke for switching into programming mode	s	5	Only possible after power has been restored.
Minimum duration of double keystroke to store position	s	1	
Maximum time for programming mode	min	10	Time starts again each time after position is stored.
Rotor standstill detected	s	2	Absolute standstill required.
Internal switching pause between upward / downward motion	s	0.6	

Tab. 8 Constant definitions



16 Overview of commands

Command	ASCII	Buffer	Meaning
Go_Stop	A	Clear	Drive stops
Go_Reference	B	Clear	Moves to reference button
Go_Up	C	Clear	Moves to diaphragm position
Go_Down2	D	Clear	Moves to closing position
Go_Pos_Slow	E	Clear	Slow approach of an absolute / relative position
Go_Pos_Fast	F	Clear	Rapid approach of an absolute / relative position
Go_Down1	G	Set	Travel in work setting
Go_Pos_Slow%	H	Set	Slow approach of the travel path divided up as a percentage (0..255)
Go_Pos_Fast%	I	Set	Rapid approach of the travel path divided up as a percentage (0..255)
Go_Tilt%	J	Set	Slow approach of the turning angle divided up as a percentage (0..255)
Position Up	K		Number of impulses for diaphragm position
Position Down1	L		Number of impulses for work setting
Position Down2	M		Number of impulses for closing setting
Position Max	N		Number of impulses for maximum turning position
Operate	O		Manual operating mode / Start-up requirements / Configuration
Max. Torque	P (MO)		Maximum torque (200..255)
Torque Range	Q		Range with active torque detection in Down direction
Slow Motion	R (MO)		Braking path distance
	R (SO)		Speed of slow travel
Delay Fixed	S (MO)		Wait time until Self Hold (manual operation)
Delay Slow	S (SO)		Wait time until rapid operation (manual operation)
Data	T		User data / start-up automatic position calculation if needed
Date	U		Production / commissioning date
Cycles	V		Number of travel cycles
Error Cycles	W		Number of travel cycles with malfunctions
Curr. Position	X		Current number of impulses
Curr. Position %	Y (MO)		Current number of impulses as a percentage (0..255) of the travel path
Curr. Rotation	Y (SO)		Current (rotational) speed
Ref. Position	Z (MO)		Path between button and internal shaft reference
Next Reference	Z (SO)		Number of travel cycles remaining until reference trip required
Status	[Motor status with message and malfunction bits

Tab. 9 Overview of commands

Message bit		Malfunction bit	
0	Reference reached	7	Internal reference trip running
1	Up reached	8	Buffer overflow
2	Down1 reached	9	Reference invalid
3	Down2 reached	10	Torque overload in Up
4	Max. turning reached	11	Torque overload in Down
5	Target position reached	12	Mechanical defect
6	Motor stopped, buffer empty	13	Communication error
		14	Parameter not permitted
		15	<8 trips until mandatory reference

Tab. 10 Status bits

Notes

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