Instruction Manual HIPERDRIVE with EtherNet/IP

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Table of Contents

Purpose of instruction manual

This instruction manual describes the features of the HIPERDRIVE positioning system and provides guidelines for its use.

Improper use of these devices or failure to follow these instructions may cause injury or damage equipment. Every person who uses the devices must therefore read the manual and understand the possible risks. The instruction manual, and in particular the safety precautions contained therein, must be followed carefully. **Contact the manufacturer if you do not understand any part of this instruction manual.**

Handle this manual with care:

- It must be readily available throughout the lifecycle of the devices.
- It must be provided to any individuals who assume responsibility for operating the device at a later date.
- It must include any supplementary materials provided by the manufacturer.

The manufacturer reserves the right to continue developing this device model without documenting such development in each individual case. The manufacturer will be happy to determine whether this manual is up-to-date.

Conformity

This device is state of the art. It complies with the legal requirements of EC directives. This is shown by the CE mark. CE

1 Safety precautions

1.1 Appropriate use

Positioning systems are especially suitable for automatically setting tools, stops or spindles for wood-processing equipment, packing lines, printing equipment, filling units and other types of special machines.

HIPERDRIVE positioning systems are not stand-alone devices and may only be used if coupled to another machine.

Always observe the operating requirements — particularly the permissible supply voltage — indicated on the rating plate and in the “Technical data” section of this manual.

The device may only be handled as indicated in this manual. Modifications to the device are prohibited. The manufacturer is not liable for damages caused by improper use or failure to follow these instructions. Violations of this type render all warranty claims null and void.

1.2 Shipping, assembly, electrical connections and start-up

Assembly and the electrical connections should only be handled by professionals. They should be given proper training and be authorised by the operator of the facility.

The device may only be operated by appropriately trained individuals who have been authorized by the operator of the facility.

Specific safety precautions are given in individual sections of this manual.

1.3 Troubleshooting, maintenance, repairs, disposal

The individual responsible for the electrical connections must be notified immediately if the device is damaged or if errors occur.

This individual must take the device out of service until the error has been corrected and ensure that it cannot be used unintentionally.

This device requires no maintenance.

Only the manufacturer may perform repairs that require the housing to be opened.

The electronic components of the device contain environmentally hazardous materials and materials that can be reused. The device must therefore be sent to a recycling plant when you no longer wish to use it. The environment codes of your particular country must be complied with.

1.4 Symbols

The symbols given below are used throughout this manual to indicate instances when improper operation could result in the following hazards:

WARNING! This warns you of a potential hazard that could lead to bodily injury up to and including death if the corresponding instructions are not followed.

CAUTION! This warns you of a potential hazard that could lead to significant property damage if corresponding instructions are not followed.

INFORMATION! This indicates that the corresponding information is important for operating the device properly.

2 The HIPERDRIVE concept

The HIPERDRIVE positioning system, an intelligent, compact, complete solution for positioning auxiliary and positioning axes, consists of an EC motor, gear, power amplifier, control electronics, absolute measuring system and EtherNet/IP interface. The integrated absolute measuring system eliminates the need for time-consuming reference runs. Connecting to a bus system simplifies the wiring. The positioning system is especially suitable for automatically setting tools, stops or spindles for wood-processing equipment, packing lines, printing equipment, filling units and other types of special machines.

There are two options for the EtherNet/IP connection:

1) The HIPERDRIVE units are connected to a central connecting station. This connecting station is called the “HIPERDRIVE Hub”. Up to eight drives can be connected to a hub, all drives are used via the same bus address.
   In addition, the HIPERDRIVE Hub distributes the operating voltage for the drives. This means that only one cable is required to connect a drive. Both data and power for the drives are transmitted via the same cable. For the HIPERDRIVE Hub itself, apart from the fieldbus and 24V motor supply voltage, only a 24V auxiliary voltage is required for the hub electronics.

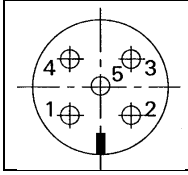
2) The HIPERDRIVE drives are equipped with a bus adapter. The bus adapter has a fixed connection to the drive. Each drive unit therefore has its own bus address and its own fieldbus connection.
   In the same way, each adapter has an input for the 24V power supply to the bus adapter and the 24V power supply to the drive.

3 Device description: HIPERDRIVE Hub

3.1 Pin assignment HIPERDRIVE Hub

A round, 5-pin plug, series 713/763 (A-coded) manufactured by Binder for the supply voltage is located on the housing cover of the HIPERDRIVE Hub.
Two round 4-pin sockets, series 825 (D-coded) are provided for connection to the bus.

Round plug for the power supply of the control unit:
(External top view)

	1: +24V control unit 2: NC 3: Ground (control unit) 4: NC 5: NC

Supply for the drives connected to the HIPERDRIVE Hub:

The motor power supply (24VDC and GND) is connected using two screw connections for cable lugs M6. These are concealed under a cover on the front side of the hub.

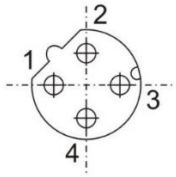
Screw terminal for each of the drives connected to the HIPERDRIVE Hub:

For each drive to be connected to the HIPERDRIVE Hub, there is a flange adapter containing a screw terminal with the following pin assignment:

Pin	Signal	Wire colour
1	RS485 data +	white
2	RS485 data -	green
3	+24V	orange
4	GND	black
5	+24V	red
6	GND	blue

Terminals 3 and 5 are connected internally in the hub, as are terminals 4 and 6.

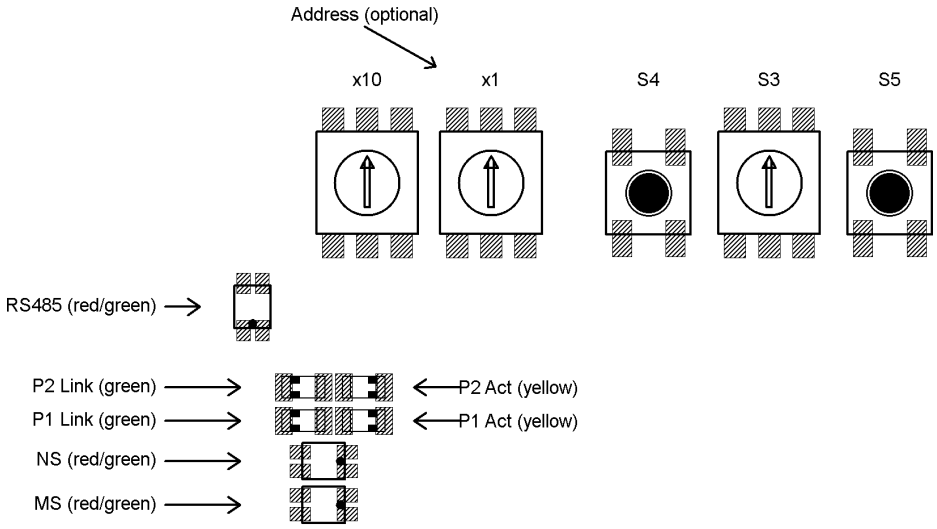
Round sockets for the bus:
(External top view)

	1: TD+ (WH/GN, white/green) 2: RD+ (WH/OR, white/orange) 3: TD- (GN, green) 4: RD- (OR, orange)

Due to the use of 4-pin sockets, only four-wire cables should be used.

3.2 LEDs and jog keys for the HIPERDRIVE Hub

Opening the housing cover on the top side of the hub provides access to the following operating and observation elements:



The LEDs are visible through two windows in the housing cover even when it is closed.

Meaning of the LEDs:

1) Each of the ports (P1/P2) has two associated LEDs (one green for the “Link” state and one yellow for the “Activity” state).

For each port the following states are possible:
- green off, yellow off → no line connection
- green on, yellow off → line connection is active, no data activity
- green on, yellow is flickering with 10 Hz → line connection is active, data activity

2) Red/green LED “Module Status” (MS)

- off → no power is supplied to the device
- flashes red/green → self test (only after power up or a reset command)
- flashes red → minor recoverable fault (e.g. incorrect configuration)
- red on → major internal fault (non-recoverable)
- flashes green → standby (not configured)
- green on → ready for operation (e.g. running correctly, valid IP address assigned)

3) Red/green LED “Network Status” (NS)

- off → no power or no IP address has been assigned
- flashes red/green → Self test (only after power up or a reset command)
- flashes red → Timeout of one or more connections
- red on → duplicate IP address
- flashes green → no EtherNet/IP connection to the scanner is established
- green on → at least one EtherNet/IP connection to the scanner is established

4) Red/green LED “RS485”

The LED “RS485” signals the status of the RS485 connections to the connected motors
Switch S3 = 0 → Displays a collective message,
Switch S3 > 0 → Status of the RS485 connection to the motor selected with S3

(see also following section)

Meaning of the rotary switches and keys:

S1/S2: Definition of the IP address (see Section 5)
S3: Selection of the drive to be jogged or to identify a faulty drive
S4: Jog the drive selected with S3. Starts a jog step with the parameters 176, 178, 180 (jog 2; default 1/16 rotation backwards)
S5: Jog the drive selected with S3. Starts a jog step with the parameters 170, 172, 174 (jog 1; default 1/16 rotation forwards)

Important: Always close the housing cover after completing the operating and observation task. This will prevent dust and contaminants from entering the device.

The HIPERDRIVE drives can only be run via the bus if S3 is set to 0.

3.3 Meaning of the LED statuses of LED “RS485”

The LED RS485 shows a collective message. When switch S3 is set to 0, the meanings are as follows:

Status	Meaning
off	No power supply to the HIPERDRIVE electronics.
flashes red+green alternately (5 Hz)	Presence test The hub is detecting the ports to which drive are connected
red on	Communication error for at least one of the drives marked as “required”
red+green on	Drive error for at least one of the drives marked as “required” (communication to these drives is functioning correctly)
flashes green (2 Hz)	All drives marked as “required” are functioning without communication or drive errors. At least one further drive exists, which is not marked as “required”. No drive errors for any “non-required” drive.
flashes red+green simultaneously (2 Hz)	All drives marked as “required” are functioning without communication or drive errors. At least one further drive exists, which is not marked as “required”. At least one of the “non-required” drives has a drive error.
green on	Only the drives marked as “required” are available and none of these have a drive error.

When S3 is set to a value > 0, the LED RS485 shows the status of the drive selected using the switch S3:

Status	Meaning
off	Not available and not required.
red on	Communication error
red+green on	Communication OK, but drive error
green on	Communication OK, no drive error

When the S3 switch is set to 0, it is therefore possible to view the communication status with the drives and, if a problem arises, identify the specific drive causing the problem by using the S3 switch to the next corresponding position.

3.4 Start-up: HIPERDRIVE Hub

After connecting the supply voltage, the hub automatically performs a presence test.

During this test, the hub detects the ports to which drives are connected. For each drive, the baud rate is set to the last value saved in the hub for the specific drive. The "RS485 message complete time" (time after which the drive evaluates a received message) is set to a value corresponding to the desired baud rate. The RS485 address of the drive is set to 1 (steady-state).

In addition, the hub loads the most recently saved information about the ports at which drives were most recently required, i.e. were released for issuing run commands.

If at least one drive requested recently is not found, the LED RS485 is illuminated red.

If precisely the number of drives requested recently is found, the LED RS485 is illuminated green.

If more drives than last required are found, the LED RS485 flashes green (frequency 2 Hz).

In the delivery state, no drive is marked as "required".

A drive must first be "required" at the hub in order to execute run commands. For the drive "n", this is done by setting the parameter (152 + (n-1) * 100) to 1.

The presence test can also be repeated at any time after switching on the supply voltage by setting parameter 47 to -4.

4 Device description: HIPERDRIVE bus adapter

4.1 Assembly of the HIPERDRIVE drives with bus adapter

The drives are fixed in position using 4x M5 screws via the centring spigot flush on the mounting surface. Please ensure that the screw depth in the mounting surface is at least 10mm.

The mounting flange is symmetrical, i.e. the drives can be mounted in four different angle positions on the mounting surface depending on the cable outlet.

The shaft connection with the feather key shows a positive engagement. When installing mechanical coupling elements, please take note of the permitted axial and radial forces stated in the “Technical data” section. If necessary, use a suitable coupling element to balance the axial and radial tolerances.

To prevent damage to electromechanical components, please avoid banging or knocking the output shaft.

4.2 Pin assignment: HIPERDRIVE bus adapter

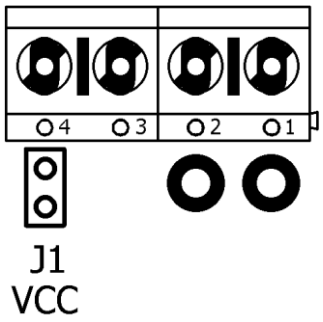
A 4-pin screw terminal for connecting the supply voltage is located in the housing cover of the HIPERDRIVE bus adapter. A PG threaded connection through which the screw terminal can be accessed is provided as standard. Optionally, these terminals are already factory-wired to the pins of a 7/8″ plug (manufacturer: Lumberg; designation RSF 50/11-04). In this case, the PG threaded connection is omitted.

Two round 4-pin sockets, series 825 (D-coded) are provided for connection to the bus.

Screw terminal for the power supply of the HIPERDRIVE drive unit with bus adapter:

1 GND drive
2 +24V drive
3 GND bus adapter
4 +24V bus adapter

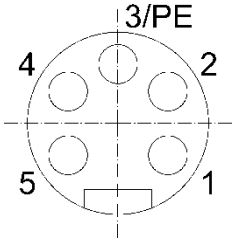
The bus adapter electronics can either be powered via separate connection points (terminals 3/4) or be interconnected with the motor power supply via the jumpers J1 and J2 in the adapter:



The former is generally selected if the motor power supply is run in a safety circuit with the EMERGENCY STOP and the databus has to remain active during an EMERGENCY STOP, or if the motor power supply does not permit correct operation of the bus adapter due to inadequate voltage stability or high interference voltages.

In addition, the two GND potentials should be connected outside the device (e.g. directly at the power supplys which provide the two supply voltages) so that potential compensating currents will not flow through the device.

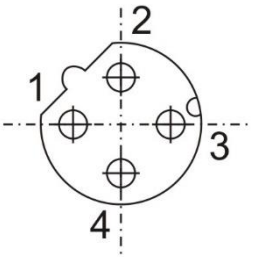
Round plug for power supply (optional):
(External top view)



1 +24V Motor
2 Ground (motor)
3 Housing
4 Ground (control unit)
5 +24V control unit

Round socket for the bus:

(External top view)

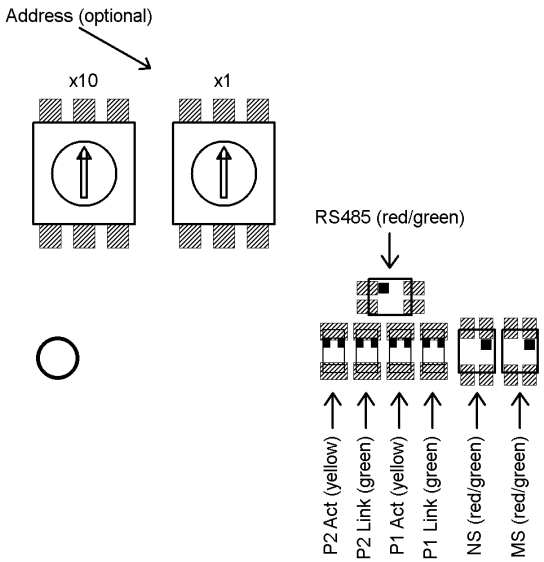


1 TD+ (WH/GR, white/green)
2 RD+ (WH/OG, white/orange)
3 TD- (GR, green)
4 RD- (OR, orange)

Due to the use of 4-pin sockets, only four-wire cables should be used.

4.3 LEDs for the HIPERDRIVE bus adapter

Opening the cover of the bus adapter provides access to the following operating and observation elements:



The LEDs are visible through two windows even when the bus adapter cover is closed.

Meaning of the LEDs:

1) Each of the ports (P1/P2) has two associated LEDs (one green for the “Link” state and one yellow for the “Activity” state).

For each port the following states are possible:
- green off, yellow off → no line connection
- green on, yellow off → line connection is active, no data activity
- green on, yellow is flickering with 10 Hz → line connection is active, data activity

2) Red/green LED “Module Status” (MS)

- off → no power is supplied to the device
- flashes red/green → self test (only after power up or a reset command)
- flashes red → minor recoverable fault (e.g. incorrect configuration)
- red on → major internal fault
- flashes green → standby (not configured)
- green on → ready for operation (e.g. running correctly, valid IP address assigned)

3) Red/green LED “Network Status” (NS)

- off → no power or no IP address has been assigned
- flashes red/green → Self test (only after power up or a reset command)
- flashes red → Timeout of one or more connections
- red on → duplicate IP address
- flashes green → no EtherNet/IP connection to the scanner is established
- green on → at least one EtherNet/IP connection to the scanner is established

4) Red/green LED “RS485”

The LED “RS485” signals the status of the RS485 connection to the connected motor (collective message, see also following section).

Meaning of the rotary switches:

The two rotary switches are used to define the IP address (see Section 5). These can be accessed by opening the cover of the bus adapter.

Important: Always close the cover of the bus adapter after completing the operating and observation task. This will prevent dust and contaminants from entering the device.

4.4 Meaning of the LED statuses of LED “RS485”

LED-RS485 shows a collective message.

Status	Meaning
off	No power supply to the HIPERDRIVE electronics.
flashes red+green alternately (5 Hz)	Presence test The bus adapter determines whether communication with the basic unit has been established.
red on	Communication error to the drive, if this is marked as “required”
red+green on	Drive error (communication to the drive is functioning correctly)
flashes green (2 Hz)	The drive is not marked as “required”, no drive error.
flashes red+green simultaneously (2 Hz)	The drive is not marked as “required”, the drive has a drive error.
green on	Communication to the drive is functioning correctly, the drive has no drive error.

4.5 Start-up: HIPERDRIVE bus adapter

After connecting the supply voltage, the bus adapter automatically performs a presence test:

During this test, the adapter determines whether a drive is connected to the adapter. If so, the transfer rate is set to the last value saved in the adapter. The “RS485 message complete time” (time after which the drive evaluates a received message) is set to the value corresponding to the desired baud rate. The RS485 address of the drive is set to 1 (steady-state).

If no drive is found, the LED RS485 is illuminated red.

If the drive is found, the LED RS485 is illuminated green.

5 Setting the IP address

The IP address can be provided in 5 different ways:

1) Address assignment via DHCP:
   To do this, set address **99** using the address switches (if present) before powering up the device.

2) Address assignment via BOOTP:
   To do this, set address **98** using the address switches (if present) before powering up the device.

3) Use the last assigned and saved address:
   To do this, set address **97** using the address switches (if present) before powering up the device. The IP address, netmask and gateway then come from the internal EEPROM and will be used if they are ≠ 0.

4) Assign a fixed address using address switches:
   To do this, set an address in the range **1…96** using the address switches (if present) before powering up the device. The following settings will then result:
   - IP address = 192.168.1.0 + value of address switches
   - netmask = 255.255.255.0
   - gateway = 0.0.0.0 (not used)

5) Use the last address assigning method which has been set by the EIP scanner:
   To do this, set address **0** using the address switches (if present) before powering up the device.

   TCP/IP object; attr. 3 (Configuration Control) was last
   0 → The IP address, netmask and gateway then come from the internal EEPROM and will be used if they are ≠ 0.
   1 → Address assignment via BOOTP
   2 → Address assignment via DHCP

   The value of attr. 3 will be stored with each change in the EEPROM and be evaluated during the next power-up.

By setting “configuration control” to 0, the current IP address being used (e.g. received by DHCP) can be saved permanently in the EEPROM of the drive.

For variants with address switches, the current IP address being used (e.g. received by DHCP) can be saved permanently in the EEPROM of the drive by setting the address switch from a value ≠ 97 to 97 when the drive is powered up.

In the delivery state, the address switches (if present) are in switch setting 0, the default setting of “configuration control” is 2,

i.e. in the delivery state the address assignment is always carried out via DHCP.

6 The EtherNet/IP interface

6.1 Operating principle

Both pure UCMM based and connection based communication with assemblies are supported for the process data (see the EDS file which belongs to the device).

To move the drive, the control word, the percentaged target speed, percentaged maximum torque and the target position have to be set appropriately. These are encapsulated in the Assem100 together with the output data of the parameter interface (PLC output data).

The feedback from the drive (PLC input data, Assem101) consists of a state (“status word”) and the actual values of speed and position (“actual speed”, “actual position”) as well as the input data of the parameter interface.

The parameters (e.g. lower limit) can be set in three different ways:

1) via the configuration while establishing the connection (Assem104)
2) acyclically with read/write requests
3) via the parameter interface in the process data (Assem100, Assem101)

The parameter values are stored in a non-volatile manner in the drive, i.e. if particular (or all) values are not configured, the drive works with the saved value. These are the default values in the delivery state and are suitable for many applications.

Configuration:

A control bit has to be transmitted before the actual value to be adopted by a particular parameter. This specifies whether the drive should accept or ignore the configuration value. If the configuration value is to be ignored, this control bit must be set to 0, otherwise it will be adopted.
Example: In order to accept the lower limit position in the configuration, the control bit “position lower limit - Enable” must be set to 1, the value in “position lower limit - Value” will then be accepted as the lower limit position. The advantage of this method is that when a parameterization is performed in the context of running up a device, parameters may be adopted from the project design. Alternatively, the values stored in the EEPROM of the drive may remain valid. This is controlled by the control bit, described above, which is available for each parameter in the EDS file and displayed in the project design.

The configuration contains the parameters 24 to 46 and 152 + (n-1) * 100 to 192 + (n-1) * 100. The corresponding control bits are contained in the parameters 23 to 45 and 151 + (n-1) * 100 to 191 + (n-1) * 100, where n represents the number of the drive.

Process data:

An output assembly and input assembly exist as process data for the EIP scanner. These assemblies have a length of 16 bytes for the HIPERDRIVE bus adapter and a length of [8 bytes * (max. number of connectable drives + 1)] for the HIPERDRIVE Hub. Process data are used to activate and monitor positioning runs as well as reading and writing parameters. The “parameter interface” feature is included for this purpose.

Acyclical read and write requests:

Instead of using the parameter interface, all parameters can also be accessed using acyclical read and write requests (“Get Attribute Single” / “Write Attribute Single”, classes 0x64 to 0x6C, instance 1). The class number and attribute number for a specific parameter are calculated as follows for acyclical read and write requests:

For all parameters < 100:
→ Class = 0x64
→ Attribute no. = Parameter

For all parameters ≥ 100:
→ Class = 0x64 + Parameter / 100
→ Attribute no. = Parameter - 100 * (Class - 0x65)

The resulting attribute number for all drives is therefore always identical to the parameter number of the HIPERDRIVE bus adapter or the first drive on the HIPERDRIVE Hub.

6.2 Table of implemented parameter entries (classes 0x64 to 0x6C; instance 1)

The area up to parameter 99 of the parameter range contains those parameters that only exist once regardless of whether the HIPERDRIVE unit is a drive with a bus adapter or a hub and independently of the number of drives that can be connected to a hub.

Name, designation	Parameter number	Function	Range of values	Back up?	Delivery state	R/W
U control	9	Current supply voltage to control unit, in 0.1 V	16 bit			R
Device temperature	11	Internal device temperature in °C	16 bit			R
Address switch	12	Current setting of the address switches	16 bit			R
HIPERDRIVE category	13	Adapter → “HIPERDRIVE SINGLE” 4-port hub → “HIPERDRIVE HUB-4” 8-port hub → “HIPERDRIVE HUB-8”				R
HIPERDRIVE name	15	Type designation as string				R
Item number	16	halstrup-walcher article number as string (format xxxx.xxxx)				R
Serial number	17	Serial device number of the hub or adapter	0… 65535 16 bit			R
Production date	18	Year and week of manufacture as string (format WW/YYYY)				R
Version	19	Software version number as string (format x.xx)				R
general purpose register	24-42	10 general purpose registers	32 bit	yes	0	R/W

Name, designation	Parameter number	Function	Range of values	Back up?	Delivery state	R/W
Delivery state	47	Writing a "-4": resets all the connected drives and sets the desired baud rate The execution of this command may take up to 2 sec for the HIPERDRIVE bus adapter and up to 8 sec for the HIPERDRIVE Hub → Watch acknowledgement of drive (receiving of Response identifier if parameter interface is used or answer to the write request). Writing a "-3": sets the values of all parameters to the delivery state, erases the IP address, sets the address assignment method to DHCP and saves all parameters in EEPROM Writing a "-2": sets the values of all the parameters that can be saved in the hub or adapter to the last values saved by the user, without saving the parameters in EEPROM Writing a "-1": sets the values of all the parameters that can be saved in the hub or adapter to the delivery state, without saving the parameters in EEPROM (IP address and address assignment method remain unaffected) Writing a "1": saves the parameters in EEPROM Reading after booting: 0 → Memory content correct ≠ 0 → Memory content incorrect Reading after saving: 0 → Saving sucessfully completed ≠ 0 → Saving not yet completed or completed incorrectly (saving can take up to 200ms)	-4, -3, -2, -1 or 1 (during writing) 0..3 (during reading) ±15 bit	no		R/W

For HIPERDRIVE Hubs, the following section is repeated for each additional drive:

The area above parameter 100 of the parameter range contains those parameters that exist once for each connectable drive.

The following table describes the parameters for the first drive connected, i.e. drive 1 on the hub or the drive connected to the HIPERDRIVE bus adapter.

For each additional drive, a parameter number is created for a specific parameter by adding n * 100 to the stated number. i.e.

$$\textbf{Parameter number}_{\text{Drive n}} = \textbf{Parameter number}_{\text{Drive 1}} + (n - 1) * 100$$

Name, designation	Parameter number	Function	Range of values	Back up?	Delivery state	R/W
Control word	101	Start and finish positioning runs (see diagram)	16 bit	no	0	R/W
Percentaged target speed	102	Sets the speed (r.p.m.) as % of the maximum value (parameter 166)	1…100 8 bit	no	100	R/W
Percentaged maximum torque	103	Sets the torque as % of the maximum value. Internally, the value is rounded up to multiples of 25%.	1…100 8 bit	no	100	R/W
Target position	104	Target position The upper 16 bits represent the number of rotations, the lower 16 bits represent the desired angle within a rotation (applicable for default values of the scale setting, parameters 154-156)	±31 bit	no	0	R/W
Status word	105	Status of the drive (see diagram)	16 bit			R
Actual r.p.m.	106	Current speed in [0.1 r.p.m.] (applicable for default values of the scale setting, parameters 162-164)	±15 bit			R
Actual position	107	Current position of the output shaft The upper 16 bits represent the number of rotations, the lower 16 bits represent the desired angle within a rotation (applicable for default values of the scale setting, parameters 154-156)	±31 bit			R

Name, designation	Parameter number	Function	Range of values	Back up?	Delivery state	R/W
Fault buffer *)	108-115	The most recent causes of faults or errors Parameter 108: latest cause of error … Parameter 115: oldest cause of error (still filed) Error codes: 0x8200 Overcurrent 0x8201 Undervoltage 0x8202 Temperature too high 0x8203 Drag error 0x8300 block detection in backward direction 0x8301 block detection in forward direction 0x8304 Lower limit reached 0x8305 Upper limit reached 0x8401 Internal error (control loop) 0x8410 Internal error (EEPROM) 0x8500 Attempted start of a positioning run not possible (e.g. due to an RS485 communication error) 0x8501 Value transferred to the parameter is not valid 0x8502 Internal error (SINCOS evaluation) 0x8503 Target position invalid 0x8601 Communication timeout (drive received no message from the RS485 master) 0x8603 RS485 communication error (no valid response from the drive)	 16 bit … 16 bit			 R … R
Error status ‘HD_Err’	116	Status ‘HD_Err’ from the last transfer	16 bit			R

*) In case the EtherNet/IP interface is switched on continuously, the fault buffer might be filled with one or more values after switching off and on again the motor power supply. This neither influences the processing of the flow chart (see section “Flow chart”) nor the actual values of the status bits.
However, after switching on the motor power supply again, the fault buffer might be flushed in the following way as needed:
If the only error code which is contained is error code 0x8603, a simple flushing of the fault buffer is sufficient (by setting parameter 197 to 0). However, if additional error codes are listed, rather a reset of all connected drives has to be carried out. This takes place by setting parameter 47 to -4. Alternatively, the reset might also be executed by a positioning run, e.g. to the actual position. After this run has been finished, the fault buffer also might be flushed by setting parameter 197 to 0.

Name, designation	Parameter number	Function	Range of values	Back up?	Delivery state	R/W
Error status 'Motion_ Status'	117	Status 'Motion_Status' from the last transfer	16 bit			R
Error status 'SCI_Err'	118	Status 'SCI_Err' from the last transfer (independent of the state of the drive) 0x0000 → no error or no communication is requested 0xFFFF → no communication is possible (eventually the power supply of the connected drive is missing) other values → communication is present, but with errors	16 bit			R
Drive temperature	119	Internal drive temperature in °C	8 bit			R
Drive variant number	120	0 → No drive connected 1 → HRA25A 2 → HRA25B 3 → HRA25E 4 → HRA35A 5 → HRA35B 6 → HRA35E 7 → HDA30A 8 → HDA30B 9 → HDA30E 10 → HDA45A 11 → HDA45B 12 → HDA45E 13 → HDA70 0xFFFF → other	16 bit			R
Drive variant name	121	Name of the drive variant as string				R
Item number of the drive	122	halstrup-walcher article number of the drive as string				R
Serial number of the drive	123	Serial number of the drive as string				R
Production date of the drive	124	Year and week of manufacture of the drive as string (format WW/YYYY)				R
Version of the drive	125	Software version number of the drive as string (format x.xx)				R
Nominal data of the drive	126-129	126: Nominal voltage [V] 127: Nominal current [A] 128: Nominal torque [Nm] 129: Nominal rated speed [r.p.m.] The data are displayed as a string. An "A" preceding any value signifies that this value must be divided by 10.				R R R R

Name, designation	Parameter number	Function	Range of values	Back up?	Delivery state	R/W
Drive required	152	0 → The drive is not accepting run commands issued via EtherNet/IP, the actual values (status word, actual r.p.m. and actual position) are not being updated. 1 → The drive can be run via EtherNet/IP, the actual values are updated cyclically. A transition from 0 to 1 sets the drive to the last baud rate saved in the hub or adapter and performs a reset.	0…1 8 bit	yes	0 (at the hub) 1 (at the adapter)	R/W
Position scaling	154, 156	Scaling of the position 154: Numerator value 156: Denominator value	 16 bit 16 bit	 yes yes	 256 1	 R/W R/W
Position lower limit	158	Minimum permitted target position The upper limit must be min. 1 higher than the lower limit. Values will only be accepted if the current actual position is within the newly defined positioning range.	see table ±31 bit	yes	see table	R/W
Position upper limit	160	Maximum permitted target position	see table ±31 bit	yes	see table	R/W
Speed scaling	162, 164	Scaling of speed (r.p.m.) 162: Numerator value 164: Denominator value	 16 bit 16 bit	 yes yes	 10 1	 R/W R/W
Max. target speed (r.p.m.)	166	100% value of the target speed [0.1 r.p.m.]	5…350 16 bit	yes	350	R/W
Jog 1	170-174	Inching run with switch “S5” (“Jog +”) 170: step width: Number of increments a drive is moved by pressing the switch “S5” 172: Sets the speed (r.p.m.) as a % of the max. value (parameter 166) 174: Sets the torque as % of the maximum value	 ±31 bit 1…100 8 bit 1…100 8 bit	 no no no	 4096 100 100	 R/W R/W R/W
Jog 2	176-180	Inching run with switch “S4” (“Jog -”) 176: step width: Number of increments a drive is moved by pressing the switch “S4” 178: Sets the speed (r.p.m.) as a % of the max. value (parameter 166) 180: Sets the torque as % of the maximum value	 ±31 bit 1…100 8 bit 1…100 8 bit	 no no no	 -4096 100 100	 R/W R/W R/W
Idle period for manual run	182	Length of time a manual run key must be held pressed in order to begin a manual run [ms]	100… 10000 16 bit	no	1000	R/W

Name, designation	Parameter number	Function	Range of values	Back up?	Delivery state	R/W
Timeout	186	Time for RS485 communication timeout If the status of the drive is at least "Ready for operation" and no telegram is received from the RS485 bus master within the stated time, the drive enters the error state. If the drive is running at that moment, it will stop. Specification is made in [0.1s]. Value 255 means that the monitoring is deactivated.	1… 100 or 255 16 bit	yes	20	R/W
Address (drive)	188	RS485 address of the drive The change of address will only come into effect after a reset. The address is not important for the EtherNet/IP connection of the drive. Every activation of the drive via EtherNet/IP sets the address to 1.	0…253 8 bit	yes	1	R/W
Baud rate	190	RS485 baud rate of the drive The values 9600, 19200 and 38400 are permitted. The appropriate value for the "message complete time" is also transmitted at the same time as the baud rate is being written. The change to the baud rate will only come into effect after a reset as well as after every activation of the operated drive (parameter 152 from 0 to 1). A change to the baud rate will also be noticed in the hub or adapter and, if necessary, saved in its EEPROM (by setting parameter 47 to 1), so that the desired baud rate is also valid for a new drive if the old drive has to be replaced.	32 bit	yes	38400	R/W
Complete time	192	RS485 message complete time [ms] The drive considers the transmission of a message to have been completed if no further byte is received within the stated period of time. The parameter is reset automatically during every power-up and every time the drive is activated (parameter 152 from 0 to 1) with the value corresponding to the desired baud rate (parameter 190). The change to the message complete time will only come into effect after a reset.	16 bit	yes		R/W

Name, designation	Parameter number	Function	Range of values	Back up?	Delivery state	R/W
Number of faults	197	Number of faults that have occurred since the last clearing of the fault buffer (or since the last activation of the axle). Setting to 0 clears the error list, other values are not permitted.	8 bit	no		R/W
New target position	198	Actual position to be displayed at the current position The new actual position must be located within the position range defined by the limits. The value is used for referencing the internal measuring system to the physical conditions. Resetting has no effect. Setting to the delivery state sets the value to 0, the new actual position then corresponds to the position of the output shaft and is located between 0 and 1 revolution. The value entered is rounded up or down to a multiple of 64.	±31 bit	yes	0	R/W
Delivery state (for the drive)	199	0 → The drive performs a reset (corresponds to switching off and back on again) 1 → The drive parameters are reset to the delivery state. The changes come into effect immediately. (The RS485 parameters “message complete time”, “address” and “baud rate” are not affected.)	0…1 8 bit	no		W

Table of rated speed and torque values for various models of gears

	Device type	HDA 30 HDA 45	HDA 70	PSE441
Name, designation	Parameter number	Range of values delivery state	Range of values delivery state	Range of values delivery state
Position lower limit	158	-512 rot…+512 rot -511 rot	-16000 rot…+16000 rot -16000 rot	-127 rot…+127 rot -127 rot
Position upper limit	160	-512 rot…+512 rot +511 rot	-16000 rot…+16000 rot +16000 rot	-127 rot…+127 rot +127 rot
New target position	198	-512 rot…+512 rot 0	-16000 rot…+16000 rot 0	-127 rot…+127rot 0

6.3 Process data format

The following table describes the process data for the first drive connected, i.e. drive 1 on the hub or the drive connected to the HIPERDRIVE bus adapter.

In each case, the process data for additional drives (on the hub) is attached before the parameters of the parameter interface, i.e.

$$\textbf{Byte number}_{\textbf{Drive n}} = \textbf{Byte number}_{\textbf{Drive 1}} + (n - 1) * 8$$

The parameters for the parameter interface are located at the end of the output and input modules.

1) Output module (from the perspective of the EIP scanner)

Assignment:

Byte	Meaning	Corresponding parameter number
0-1	Control word	101
2	Percentaged target speed	102
3	Percentaged maximum torque	103
4-7	Target position	104
8-9	PKE	3
10-11	IND	4
12-15	PWE	5

2) Input module (from the perspective of the EIP scanner)

Assignment:

Byte	Meaning	Corresponding parameter number
0-1	Status	105
2-3	Current r.p.m.	106
4-7	Actual position	107
8-9	PKE	6
10-11	IND	7
12-15	PWE	8

If the parameter interface (PKE/IND/PWE) is not required, the data length can be reduced by 8 bytes with the help of the EDS file (e.g. from 16 bytes to 8 bytes for the HIPERDRIVE bus adapter or from 72 bytes to 64 bytes for the HIPERDRIVE Hub for 8 drives). To do this, set the parameters Param1 and Param2 to the entry “without Parameter Interface”.

Please note:
Param1 and Param2 must always contain the same entry (e.g. both “with Parameter Interface” or both “without Parameter Interface”).

6.4 Detailed description of status bits

The functions of the status and control bits are based on the PROFIDRIVE protocol:

Bit 0: Ready to switch on
This bit is set:
- when bit 10 of the control word is set (set control word to 0x0400)

This bit is reset:
- when bit 10 is reset (set control word to 0x0000)

Bit 1: Ready for operation
This bit is set:
- when bit 0 of the control word is set in the state “Ready to Switch on” (set control word to 0x0401)

This bit is reset:
- when bit 0 is reset

Bit 2: Operation enabled
This bit is set:
- when bit 3 of the control word is set in the state “Ready for operation” (set control word to 0x0409)

This bit is reset:
- when bit 3 is reset

Bit 3: Fault
This bit is set:
- when an error arises if the state is at least “Ready for operation”

This bit is reset:
- in the case of a negative edge of bit 7 of the control word

Bit 4: No OFF2
This bit is set:
- when a drive is being detected during the presence test
- when a drive is marked as “required” by the PLC

This bit is reset:
- at the beginning of a presence test

Bit 5: No OFF3
This bit is set:
- when a drive is being detected during the presence test
- when a drive is marked as “required” by the PLC

This bit is reset:
- at the beginning of a presence test

Bit 6: Switch on inhibit
This bit is set:
- in the case of a negative edge of bit 7 of the control word in the state “Fault”

This bit is reset:
- in the case of a negative edge of bit 0 of the control word

Bit 7: Warning
This bit is set:
- when an error arises (independent of the operating status)

This bit is reset:
- when all the errors present have been eliminated
  When the bit “Fault” is active, the bit will only be reset together with the bit “Fault” once the state “Fault” has been acknowledged.

Bit 8: No drag error
This bit is set:
- when no drag error occured during a movement (i.e. the difference between the target and actual position is within in the drag error window)

This bit is reset:
- at the beginning of a presence test
- when a drag error occured during a movement (i.e. the difference between the target and actual position is not within in the drag error window)

Bit 9: Control requested
This bit is set:
- when a drive is being detected during the presence test
- when a drive is marked as “required” by the PLC

This bit is reset:
- at the beginning of a presence test

Bit 10: Target position reached
This bit is set:
- when a drive has arrived at its target position

This bit is reset:
- at the beginning of a positioning run
- when the state is less than “Ready for operation” (in the states “Fault” and “Switch on inhibit”, the bit initially retains its old value)

Bit 11: Reference point set
This bit is set:
- when a drive is being detected during the presence test
- when a drive is marked as “required” by the PLC

This bit is reset:
- at the beginning of a presence test

Bit 12: Acknowledgement of target value
This bit is set:
- at the start of a movement when bit 6 of the control word is set

This bit is reset:
- at the start of a movement when bit 6 of the control word is reset
- when the state is less than “Ready for operation”

(In the state “Ready for operation” a new movement will only be started if bit 6 of the control word complements the bit “acknowledgement of target value” in the status word → toggle function.)

Bit 13: Drive at standstill
This bit is set:
- when the drive has completed a run

This bit is reset:
- at the beginning of a run

Bit 14: Motor overcurrent
This bit is set:
- when the maximum current for the drive is exceeded (in this case the drive enters the state “Fault”)

This bit is reset:
- when the state “Fault” is acknowledged (negative edge of bit 7 of the control word)

Bit 15: Position limit reached
This bit is set:
- when the actual position of the drive is located outside the range defined by the positioning range limits

This bit is reset:
- when the actual position of the drive is again located within the range defined by the positioning range limits

6.5 Detailed description of control bits

Bit 0: ON
The drive goes from the state “Ready to Switch on” into the state “Ready for operation” (bit 10 must still be set).

Bit 1: No OFF2
reserved, must be set to 0

Bit 2: No OFF3
reserved, must be set to 0

Bit 3: Operation enabled
The drive goes from the state “Ready for operation” to the state “Operation enabled” (bits 0 and 10 must still be set).

Bit 4: Function in positioning mode:
No stop
The bit must be continuously active to execute a run command. When the bit is reset, the drive stops immediately, the current run command is dismissed. The run command is activated by an edge to bit 6.

Function in speed control mode:
CLOCKWISE
If the bit is set, the movement will start in a CLOCKWISE direction, otherwise it will be COUNTERCLOCKWISE.

Bit 5: Function in positioning mode:
No intermediate stop
The bit must be continuously active to execute a run command. When the bit is reset, the drive stops immediately but the current run command is not dismissed. The run command is continued when bit 5 is set once again.

Function in speed control mode:
Endless
When this bit is set, the movement in speed control mode is endless, otherwise until it reaches the respective end of the positioning range.

Bit 6: Function in positioning mode:
Activate run command
Every edge releases a run command or new target value (toggle bit). A rising or falling edge may only be carried out if bit 12 of the status word acknowledges that the previous run command has been accepted.
In other words, the run command is activated if this bit complements the current state of bit 12 of the status word.

Function in speed control mode:
Start speed control mode
A rising edge triggers a run in speed control mode, a falling edge completes it.

Bit 7: Acknowledge fault
A negative edge acknowledges a current fault condition.

Bit 8: Inching 1 ON
The drive runs with jog target value 1 with the step width and in the direction indicated in the parameters.

Bit 9: Inching 2 ON
The drive runs with jog target value 2 with the step width and in the direction indicated in the parameters.

Bit 10: Control by the automation equipment
The drive goes from the state “Not ready to Switch on” to the state “Ready to Switch on”.

Bit 11: Start referencing
Reserved, must be set to 0.

Bit 12: Speed control mode
If this bit is set and the drive is in the state “Operation enabled”, an edge of bit 6 triggers a run in speed control mode rather than a positioning run to the desired position.

Bit 13: Reserved, must be set to 0.

Bit 14: Reserved, must be set to 0.

Bit 15: Reserved, must be set to 0.

6.6 Parameter interface

The parameter interface can be used to write and read parameter values by using the cyclic process data connection, besides, also other values might be retrieved from the HIPERDRIVE Hub or adapter.

In the parameter interface, the EIP scanner sets and transmits a new command. It repeats this command cyclically until the HIPERDRIVE Hub or adapter has processed the command and has sent back a response. The HIPERDRIVE Hub or adapter keeps this response available until the EIP scanner has formulated a new command. A parameter value sent back by the HIPERDRIVE Hub or adapter as a response to a read request, relates to the point in time at which the EIP scanner has been issued the command. I.e. if the progress of a parameter value is to be observed over a longer period of time, the EIP scanner has to send another command after taking over the current parameter value. This is done by setting the request identifier 0 (“no request”) and subsequent waiting until the HIPERDRIVE Hub or adapter confirms this request with the response identifier 0 (“no response”). Afterwards the same parameter value might be requested again.

Only one request can be processed per HIPERDRIVE Hub or adapter at any time.

Structure of the parameter interface:

Parameter interface							
PKE		IND		PWE			
0	1	2	3	4	5	6	7

PKE = Parameter identifier
IND = Index
PWE = Parameter value

Structure of the parameter identifier PKE:

The information “parameter identifier” (PKE) consists of a data word (bytes 0 and 1 of the parameter interface), in which the type of the request (or the response) and the related parameter number are coded:

Parameter code PKE															
Bit no.															
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
AK				SPM	Parameter number (PNU)										

AK = request identifier or response identifier
SPM = Toggle bit for spontaneous message (function not implemented, set to 0)
PNU = Parameter number

The parameter number (PNU) refers to the table above (“Table of implemented parameter entries (classes 0x64 to 0x6C; instance 1)”).

Request identifier (EIP scanner→ HIPERDRIVE):

Request identifier	Function	Possible response identifiers of the HIPERDRIVE Hub or adapter *)	
		positive	negative
0	No request	0	7
1	Request parameter value	1 or 2	
2	Change parameter value (word)	1	
3	Change parameter value (double word)	2	
6	Require parameter value (array)	4 or 5	
7	Change parameter value (array, word)	4	
8	Change parameter value (array, double word)	5	
9	Request number of array elements	6	

)* The column “response identifier” contains the possible responses for a certain request, distinguished between a successful completion of the request (“positive”) or an error (“negative”).

Response identifier (HIPERDRIVE → EIP scanner):

Response identifier	Function
0	No response
1	Transfer parameter value (word)
2	Transfer parameter value (double word)
4	Transfer parameter value (array, word)
5	Transfer parameter value (array, double word)
6	Transfer number of array elements
7	Cannot process request (with error number)

Subindex IND:

The field IND contains the array subindex for requests and responses relating to array elements.

Parameter value PWE:

This field contains the numerical value which belongs to the related parameter.

When a request cannot be completed successfully (i.e. response identifier AK = 7), the HIPERDRIVE Hub or adapter reports an error code according to the following table:

Error code	Meaning
0	Illegal parameter number
1	Parameter value cannot be changed
2	Minimum/maximum limit exceeded
3	Faulty subindex
4	No array
5	Incorrect data type
6	Setting not allowed (resetting only)
17	Request cannot be processed due to operating status
18	Other error

When a write request is being completed successfully (i.e. request identifier AK = 2, 3, 7 or 8) the response contains the same data as a read request of this parameter. The response identifier then is one of the values 1, 2, 4 or 5, depending on the data type. The parameter number PNU, the index IND and the parameter value PWE are the same as given in the request. Hence it is possible to check again that the HIPERDRIVE Hub or adapter actually took over the requested values.

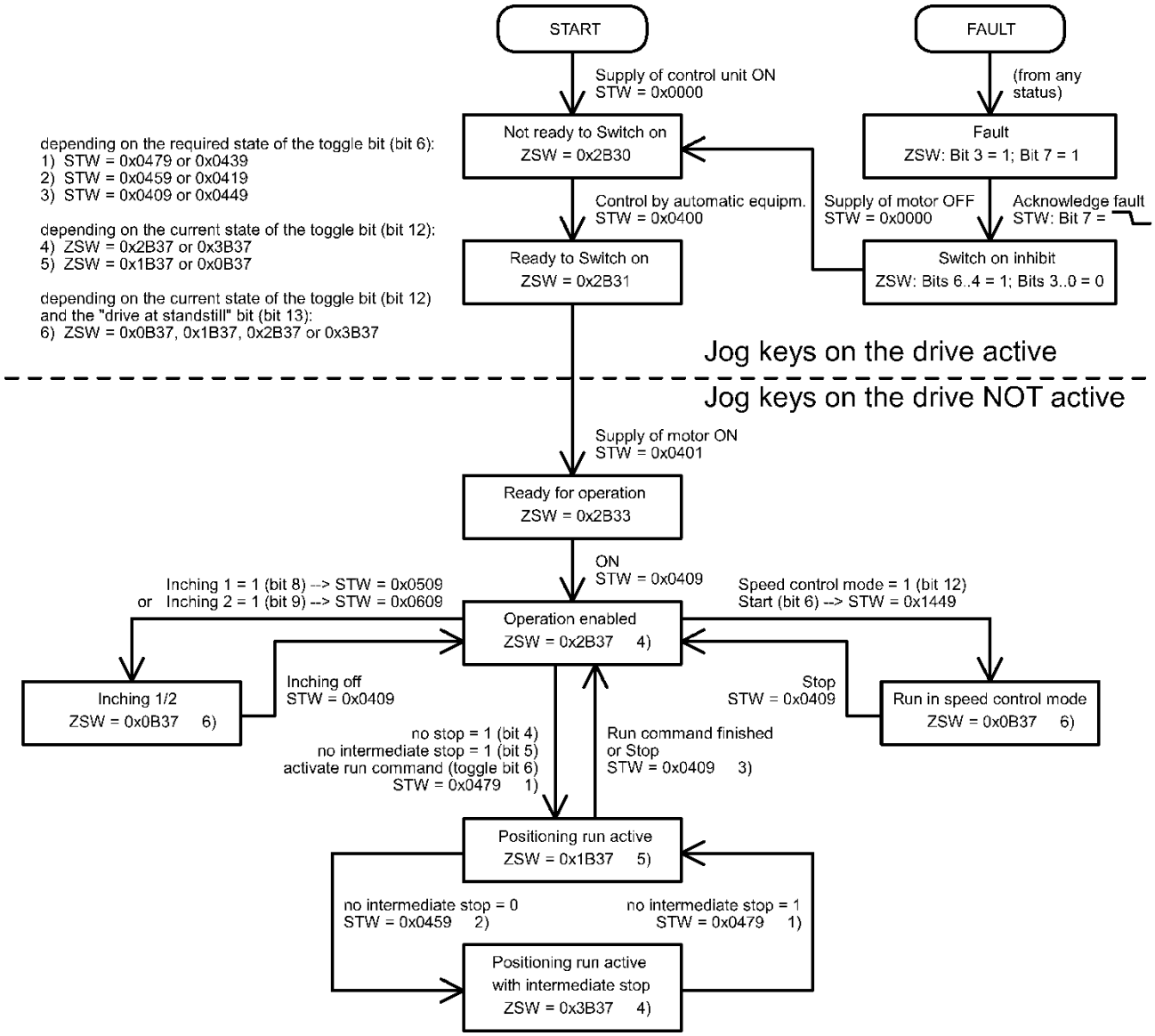
6.7 Flow chart

The following flow chart shows the possible states of a drive as well as the transitions between the states.

Abbreviations used:
STW = Control word
ZSW = Status (“status word”)

The requirement for each run is that the “percentaged target speed” and “percentaged maximum torque” have a value > 0. In addition, for a run command, the target position must be set to a permitted value.

Any jog keys which are eventually present at the drive are only active in the states “Not ready to Switch on”, “Ready to Switch on”, “Fault” and “Switch on inhibit”. In all other cases, the PLC has sole access to the drive.



7 Jog function

7.1 Jog function with jog keys on the drive

Some versions of the drive have two integrated jog keys for running left and right.

These keys are always active when the drive is not connected to a control module. When connected to a control module, they are active in the following states:
- Not ready to Switch on
- Ready to Switch on
- Fault
- Switch on inhibit

7.2 Jog function with jog keys in the HIPERDRIVE Hub

The two jog keys in the HIPERDRIVE Hub can always be used to run the drive selected using the switch S3 (located in the middle between the two jog keys) and independently of the PLC.

S4 (“Jog -”) starts a jog step with the parameters 176-180 (Jog 2),
S5 (“Jog +”) starts a jog step with the parameters 170-174 (Jog 1).

The parameterization of the jog steps is done with the values of these parameters:

Parameterization for the jogging with jog key S4 (“Jog -”):

- Par. 176 = increment and direction (default 1/16 rotation counter-clockwise)
- Par. 178 = Sets the speed (r.p.m.) as a % of the max. value from Parameter 166
- Par. 180 = Sets the torque as a % of the nominal torque

Parameterization for the jogging with jog key S5 (“Jog +”):

- Par. 170 = increment and direction (default 1/16 rotation clockwise)
- Par. 172 = Sets the speed (r.p.m.) as a % of the max. value from Parameter 166
- Par. 174 = Sets the torque as a % of the nominal torque

If the key is released during the movement, the jog step still runs until it has been completed. This makes it possible to run to a precisely defined angle. The run can be aborted before it has been completed at any time by pressing both keys simultaneously. A new jog step can only be triggered when both keys have been completely released.

If the key remains pressed after the jog step has been completed, it will be followed by a manual run, which continues until the key is released or the end of the positioning range has been reached. The parameter “idle period for manual run” (parameter 182 on drive 1) is available in order to provide better control of the transition to a manual run. The manual run begins once the set time, measured from the start of the jog step, has expired.

A manual run can also be aborted by pressing both keys simultaneously.

8 Special features

8.1 Target speed (r.p.m.) and torque

These values are stated as a percentage of a reference value. The 100% value for the target speed (r.p.m.) is stated in parameter 166 (for drive 1), the 100% value for the target torque is fixed and is the same as the nominal torque for the drive.

The maximum values valid for each movement are indicated at the beginning of each movement. If the positioning runs are started with the help of the process data, these data must also be provided. When positioning runs are issued with the help of acyclical write requests, these maximum values must be set before the start of the movement using parameters 102 and 103 (for drive 1).

If a cyclical I/O connection exists, the values for the parameters control word, percentaged target speed, percentaged maximum torque and target position from the acyclical write-requests are overwritten by the values from this connection.

8.2 Response of the drive in case of block

If the drive detects an block, the drive aborts the run and enters the state “Fault”.

An entry is then made in the fault buffer (Parameter 108-115 on drive 1). The fault must be acknowledged by a negative edge to bit 7 of the control word. The drive then enters the state “Switch on inhibit”, which can be exited by a negative edge to bit 0.

8.3 Response of the drive if it is turned manually (readjustment function)

After switching on the voltage, the drive readjusts its position if the divergence between the current actual value and the target value saved before it was last powered down is < 5°.

After reaching a target position or stopping, the drive always adjusts its position as soon as it is turned beyond the tolerance range by external forces.

8.4 Using actual value assessment factors to set the spindle pitch

Parameter numbers 154 (numerator factor) and 156 (denominator factor) can be used to modify the device’s spindle resolutions as required.

$$number\ of\ steps\ per\ revolution = 256 * \frac{numerator\ factor}{denom.\ factor}$$

The default setting for the numerator factor is 256, the denominator factor is set to 1, giving a resolution of 65,536 increments per revolution.

The numerator factor makes it simple to set the spindle pitch and resolution.
The denominator factor is primarily used for setting “unlevel” resolutions.

Examples:

Spindle pitch	Resolution	Numerator factor	Denominator factor
4 mm	1/100 mm	400	256
1 mm	1/100 mm	100	256
2 mm	1/10 mm	20	256

8.5 Aborted run when the master fails

If the connection to the master is interrupted during a positioning run, the master cannot abort a run that is already underway. Communication with the EIP scanner is monitored in the HIPERDRIVE Hub or adapter so that an automatic run abort can be generated in such a case. An abort of any positioning is triggered in all connected drives in the case of a timeout.

9 Technical data

9.1 HIPERDRIVE Hub

Ambient conditions

Ambient temperature	0 °C to +70 °C
Storage temperature	-25 °C to +75 °C
Shock resistance as stipulated in DIN IEC 68-2-27	8 g / 50 ms
Resistance to vibration as stipulated in DIN IEC 68-2-6	10 … 500 Hz: 10 g
EMC standards	CE
Conformity	CE declaration of conformity available upon request
Protection class	IP 65
Duty cycle	100 %

Electrical data

Supply voltage	24 VDC ±15 % Recommendation: Use a regulated power adapter
Nominal current, control unit	0.15 A
Motor connections	One 6-pin screw terminal per motor Max. cross section of conductor 1.5mm²
Supply voltage connection for the motors	2 x cable lug M6 Recommendation: Use a regulated power adapter
Bus connection	M12, 4-pin Type D (2 x)
Protocol	EtherNet/IP (IEC 61158-6-2)
Status information	2 x Link/Act (green/yellow) 1 x EtherNet/IP status MS (red/green) 1 x EtherNet/IP status NS (red/green) 1 x RS485 status (red/green)

Physical data

Dimensions (l x w x h)	see drawings
Weight (approx.)	1.5 kg

9.2 Drives with HIPERDRIVE bus adapter

Ambient conditions

Ambient temperature	0 °C to +60 °C
Storage temperature	-25 °C to +75 °C
Shock resistance as stipulated in DIN IEC 68-2-27	11 g / 30 ms
Resistance to vibration as stipulated in DIN IEC 68-2-6	10 … 150 Hz: 10 g
EMC standards	CE
Conformity	CE declaration of conformity available upon request
Protection class	IP 65

Electrical data

Nominal power output	HDA 30	30 W
	HDA 45	45 W
	HDA 70	42 W
Supply voltage	24 VDC ±15 % Recommendation: Use a regulated power adapter	
Nominal current	HDA 30	3.5 A
	HDA 45	4.8 A
	HDA 70	4.8 A
Connection for supply voltage	4-pin screw terminal (either with separate or shared power supply with the HIPERDRIVE electronics and the motor) Max. cross section of conductor 1.5mm² Optional: 7/8″ plug	
Bus connection	M12, 4-pin Type D (2 x)	
Protocol	EtherNet/IP (IEC 61158-6-2)	
Status information	2 x Link/Act (green/yellow) 1 x EtherNet/IP status MS (red/green) 1 x EtherNet/IP status NS (red/green) 1 x RS485 status (red/green)	
Absolute value acquisition	Magnetic and with EEPROM	

Physical data

Positioning range	HDA 30, HDA 45: HDA 70: (no mechanical limits)	1024 rotations 32000 rotations
Positioning accuracy	max. ± 2.5°	
Repeat accuracy	max. ± 1.0°	
Output shaft	Design “S”: 10 mm solid circular shaft with feather key Design “H”: 12 mm hollow shaft	
Maximum radial force	Design linear: 200 N Design radial: 440 N	
Maximum axial force	Design linear: 150 N Design radial: 165 N	
Dimensions (l x w x h)	see drawings	
Weight (approx.)	HDA 30, HDA 45 linear: HDA 30, HDA 45 radial: HDA 70 linear: HDA 70 radial:	2.8 kg 3.2 kg 2.5 kg 3.7 kg

For additional specifications and dimension drawings, please visit our website at

www.halstrup-walcher.de/en/produkte/positioniertechnik/positioniersysteme/index.php

10 Certificate of Conformity

halstrup walcher

Die Lösung liegt im Detail

EG-Konformitätserklärung im Sinne der
EG- Richtlinie 2014/30/EU, EMV

Certificate of Conformity based on the
European Standard 2014/30/EU

Der Hersteller
The manufacturer

halstrup-walcher GmbH
Stegener Straße 10
79199 Kirchzarten
Deutschland

erklärt, dass die Bauart des Produktes
declares, that the construction of instrument type

Positioniersystem Typ Hiperdrive HDA70
Positioning System Type Hiperdrive HDA70

entwickelt, konstruiert und gefertigt ist in Übereinstimmung mit den EG – Richtlinien
is developed, designed and manufactured in accordance with the EC Directives.

Störaussendung / Emmission
EN61000-6-4: 2001
EN55011:1998 + A1:1995
EN55022:1998 + A1:1995

Störfestigkeit / Immunity
EN61000-6-2:2001
EN61000-4-3:1996 + A1:1998 + A2:2001
EN61000-4-4:1995 + A1:2001 + A2:2001
EN61000-4-5:1995 + A1:2001
EN61000-4-6:1996 + A1:2001

abgegeben durch / stated by:

Sura, Christian
(Nachname, Vorname / Surname, first name)

Geschäftsführer, Managing Director
(Stellung im Betrieb des Herstellers / Position)

Kirchzarten, 19. 10. 2016
(Ort, Datum / City, Date)

(Rechtsgültige Unterschrift/ Signature)

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