SIEMENS

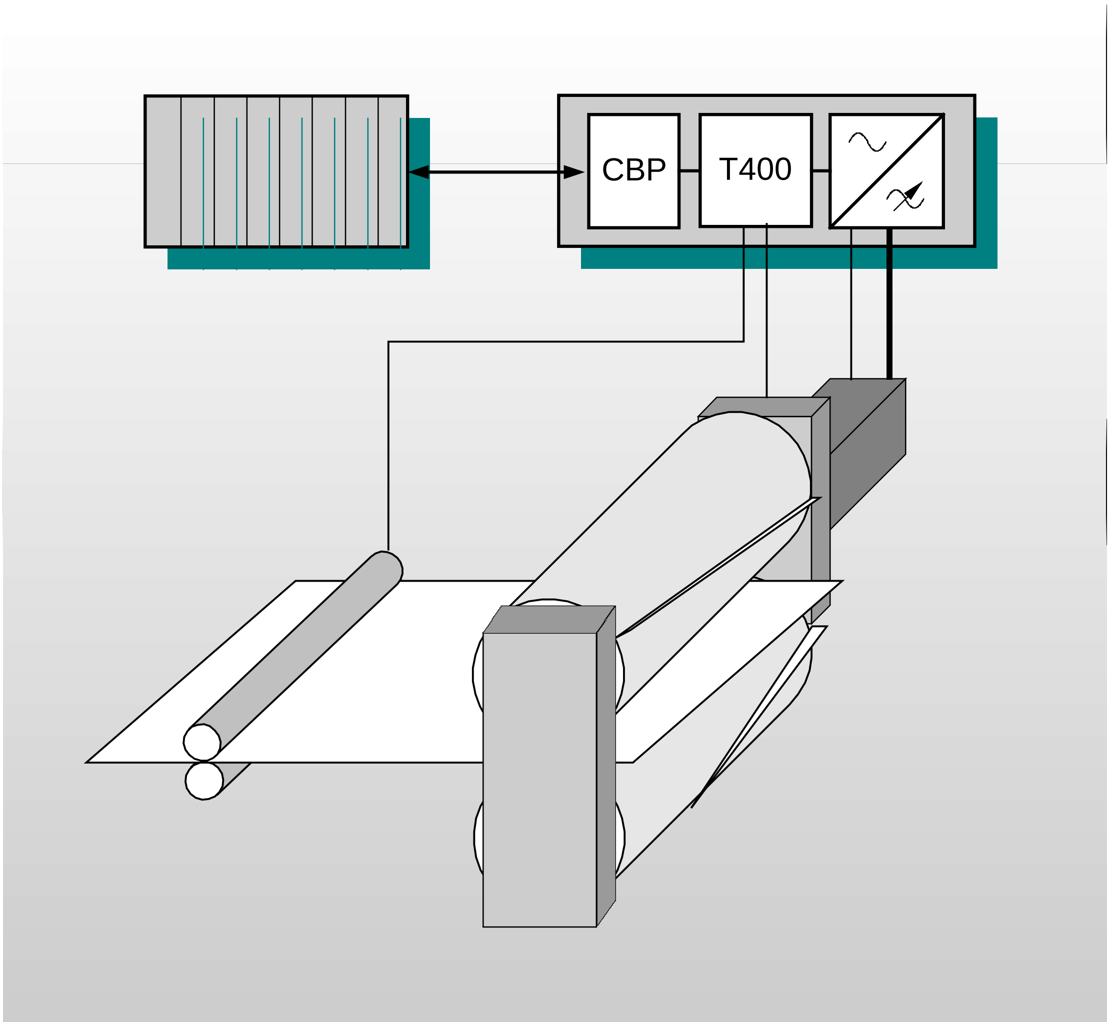
**Standard Software Package**

# Sheet-Cutter / Cut to Length

**for**

# T400 Technology Module

**Software Version 1.02**

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# 0 Warning information

**WARNING**

**Electrical equipment has components which are at dangerous voltage levels.**

**If these instructions are not strictly adhered to, this can result in severe bodily injury and material damage.**

**Only appropriately qualified personnel may work on/commission this equipment.**

**This personnel must be completely knowledgable about all the warnings and service measures according to this User Manual.**

**It is especially important that the warning information in the relevant Operating Instructions (MASTERDRIVES or DC MASTER) is strictly observed.**

## Definitions

- **Qualified personnel** for the purpose of this Manual and product labels

are personnel who are familiar with the installation, mounting, start-up and operation of the equipment and the hazards involved. He or she must have the following qualifications:

1. Trained and authorized to energize, de-energize, clear, ground and tag circuits and equipment in accordance with established safety procedures.

2. Trained in the proper care and use of protective equipment in accordance with established safety procedures.

3. Trained in rendering first aid.

**DANGER**

For the purpose of this Manual and product labels, „Danger“ indicates death, severe personal injury and/or substantial property damage will result if proper precautions are not taken.

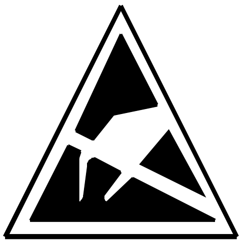
**WARNING**

For the purpose of this Manual and product labels, „Warning“ indicates death, severe personal injury or property damage can result if proper precautions are not taken

**CAUTION**

For the purpose of this Manual and product labels, „Caution“ indicates that minor personal injury or material damage can result if proper precautions are not taken.

**NOTE** For the purpose of this Manual, „Note“ indicates information about the product or the respective part of the Manual which is essential to highlight.



**CAUTION**

**This board contains components which can be destroyed by electrostatic discharge. Prior to touching any electronics board, your body must be electrically discharged. This can be simply done by touching a conductive, grounded object immediately beforehand (e.g. bare metal cabinet components, socket protective conductor contact).**

# 1 Overview

## 1.1 Validity and how the software is supplied

This Manual is valid for Version 1.0 of the standard Sheet-Cutter/Shears Control software package.

**NOTE** This documentation refers to software, generated using the graphic CFC configuring tool, for 32-bit SIMADYN D processor modules.

**Hardware configuration**

The standard software package can be purchased as a T400 technology board with software, which is ready to run. The documentation is for this particular application. Using parameters, the software can be adapted to the special task. Thus, it is possible to change fixed values and connections within the configured software.

**NOTE** The control core (all of the functions with the exception of inputs/outputs) is also available for other configurations, for example, the PM4 - PM6 CPU modules with expansion module IT41 or the T400 in the SRT400 subrack. In this case, the software package is adapted to the particular application using the graphic CFC configuring tool.

## 1.2 Order numbers

The standard Sheet-Cutter/Cut to Length software package is available, ready-to-run as T400, or as source code on floppy disk. For the source code, it involves a SIMADYN D software package. All customer-specific adaptation work can be executed and documented using the graphic CFC configuring interface.

The software is protected using a hardlock PAL, which can be inserted on all SIMADYN D processor modules. This PAL is required when operating the closed-loop control.

*Table 1-1 Components to adapt the configured software using CFC*

| Designation | Explanation | Order number |
|---|---|---|
| T400 with sheet-cutter / cut to length | High performance closed-loop sheet-cutter control, loaded on T400; with hardlock PAL; ready to run | 6DD1842-0AC0 |
| D7-ES | SIMADYN D configuring software D7-ES. This package comprises STEP7, CFC and D7-SYS on CD-ROM | 6DD1801-4DA2 |

## 1.3 Adapting the standard software package

The purpose of offering a standard software package is to provide a pre-configured control-related solution for a specific application, where it is only necessary to make a few application-specific adaptations. Further, a high degree of flexibility is demanded, in order to be able to cover as many customer requirements as possible.

The procedure for adapting the software for this particular case will now be explained using the rough structure as shown in Fig. 1-1.

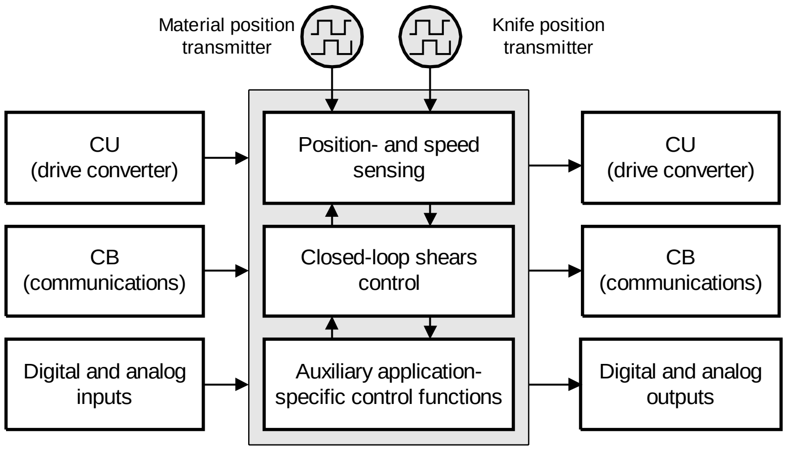



*Fig. 1-1 Rough structure of the standard software package*

The following have to be adapted:

- Defining the sources for the control signals (from CB or local input or from the basic drive (SIMOLINK) )
- Defining the setpoint channels (format entries, setpoints for the drive converter)
- Normalization of setpoints and actual values
- Specifying the plant/system geometry
- Specifying the position transmitters

This adaptation essentially involves the interfaces to the actual closed-loop control core. In the closed-loop core itself, only a few adaptations have to be made. Here the motion sequences for the different versions of the cutting device are defined. The procedure is explained using examples in the Appendix of this documentation.

## 1.3.1 Parameters

Parameters are used

- to visualize internal quantities (monitoring)
- to change fixed values
- to change inter-connections (BICO parameters)

All of the parameters, which refer to the functions and settings of the technology module, are called *technology parameters.* The technology parameters for the closed-loop cut to length are described in Section 6, and appear in the function charts in the form of the following symbols:

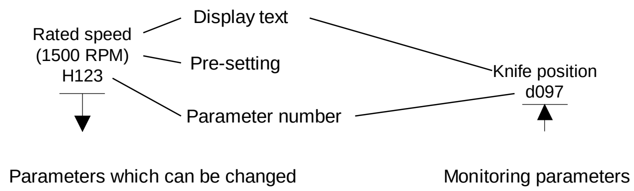



*Fig. 1-2 How parameters are shown in the function charts*

When changing parameters, it should be taken into account, that there are initialization parameters, which only become effective after the T400 has re-started.

In addition to the technology parameters, there are so-called basic drive parameters for the drive converters used. These should be taken, together with the associated charts, from the documentation of the drive converter which is used.

It should be observed that the parameters are selected by entering the number (e.g. at the operator control panel of the drive converter). However, for the display, the most significant digit is replaced by a letter, which is intended to symbolize as to whether it involves a quantity which can be changed or not changed.

**Example** "1956" is entered in order to select technology parameter "H956".

*Table 1-2 Parameter number specification*

| **Value range** | **Significance** | **Parameter display (example)** | |
|---|---|---|---|
| | | **can be changed** | **cannot be changed** |
| 0 ... 999 | Lower parameter range of the drive converter | P123 | r123 |
| 1000 ... 1999 | Lower parameter range of the T400 | H123 | d123 |
| 2000 ... 2999 | Upper parameter range of the drive converter | U123 | n123 |
| 3000 ... 3999 | Upper parameter range of the T400 | L123 | c123 |

## 1.3.2 BICO parameters

Contrary to (value) parameters, the BICO parameters define the interconnections. This means, parameters specify a fixed value at an input, whereby BICO parameters select the signal source, which is connected using the input. This signal source must be defined in the form of a connector. The BICO parameter appears as parameter in the symbol of a BICO input (Fig. 1-3).

The source and destination of a BICO interconnection must have the same data type. Thus, digital quantities (BOOL) can, for example, not be connected with floating-point inputs. Thus, for each data type used, different symbols for connectors and BICO inputs are used in the function charts.

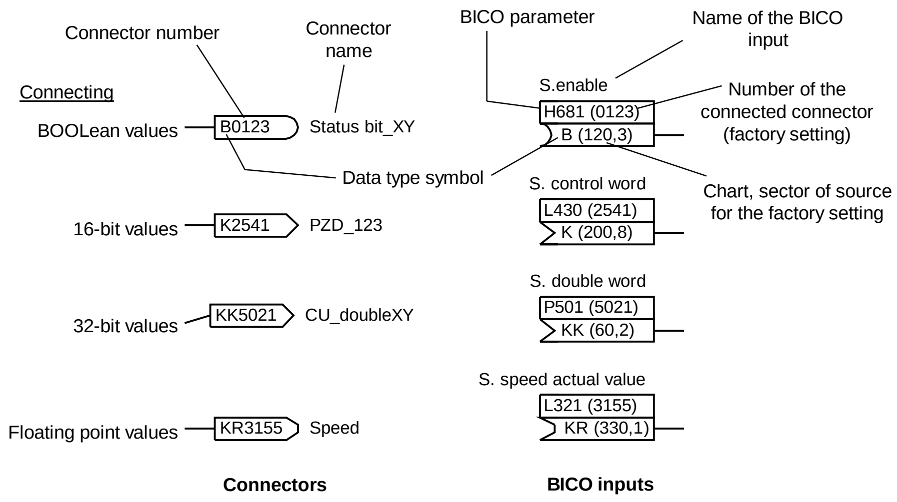



*Fig. 1-3 Symbols for connectors and BICO inputs*

### 1.3.3 Resources which are used to adapt the software and for start-up

Various resources are available which can be used to adapt the standard software package to the particular application.

*Table 1-3 Adaptation- and start-up tools*

| Name | Explanation |
|---|---|
| PMU | Input field for all MASTERDRIVES- and DC Master units (with 4-digit display) |
| OP1S | Operator control device with numerical keypad and 4-line text display; this can be directly connected at the PMU. |
| SIMOVIS | Start-up- and parameterizing software for PC (Windows). This also provides an oscilloscope function for MASTERDRIVES MC. |
| CFC | Graphic configuring tool, which is used to generate the standard software package. This is connected to the service interface of the T400.<br>Prerequisite: STEP 7; D7-SYS |
| Service-IBS (start-up) | Simple start-up- and diagnostics tool for PPC (DOS, Windows). This is also available as Telemaster for remote diagnostics. . |

The resources differ essentially by the intervention possibilities, which is shown in the following table.

*Table 1-4 Adaptation- and start-up tools*

| Intervention | CFC | PMU | OP1S | SIMOVIS | Service-start-up |
|---|---|---|---|---|---|
| View value | any | parameter | parameter | parameter | any |
| Change value | any | parameter | parameter | parameter | any |
| Change interconnection | any | BICO | BICO | BICO | any |
| Insert block | yes | no | no | no | no |
| Delete block | yes | no | no | no | no |
| Change execution sequence (run sequence) | yes | no | no | no | no |
| Change the cycle time for processing | yes | no | no | no | no |
| Duplicate software | yes | no | no | no | no |
| Duplicate parameter sets | no | no | no | yes | (macro) |
| Documentation | charts | no | no | parameter lists | no |

# 2 Introduction

## 2.1 Hardware configuration

The drive unit comprises a SIMOVERT MASTERDRIVES drive converter with integrated T400 technology module, a communications board for connection to the automation system (e.g. CBP) and a three-phase motor (synchronous or induction).

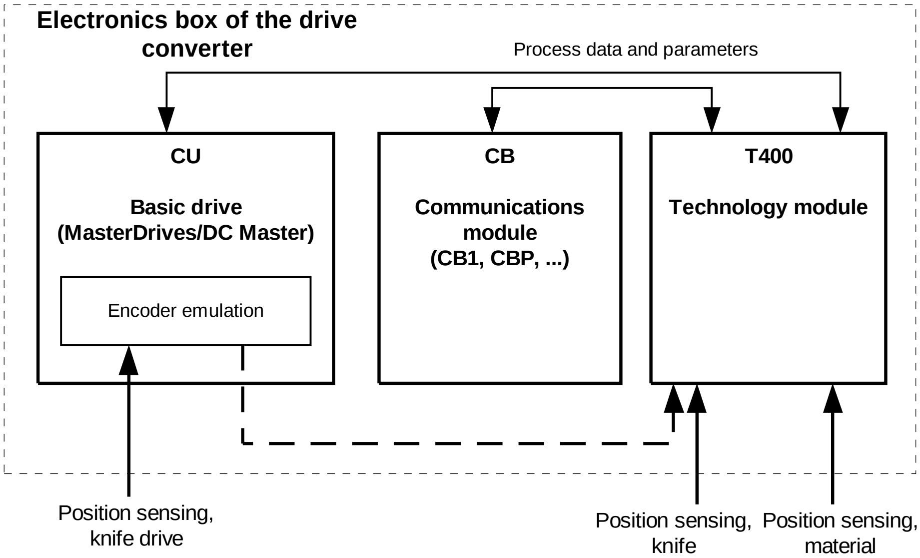



*Fig. 2-1: Typical hardware arrangement in the electronics box of a drive converter*

The cutting devices can either be shears, saw, knife, sheet-cutter or comparable elements. For reasons of simplicity, in the following text, independent of the actual version, either "knife" or "shears" are used.

The technology control is realized on the T400. The position of the material to be cut and the knife are required. Thus, the position transmitter signals of the measuring roll (material feed) and the knife must be connected to the T400. For gearless applications, the T400 receives the position tracks of the knife from the pulse encoder emulation of the MASTERDRIVES drive converter via the common backplane bus.

Data transfer between T400 and the basic drive is also realized via dual port RAM and the common backplane bus. This combination represents an optimum system integration, as the setpoints can be transmitted extremely quickly and in synchronism with the processing cycles.

## 2.2 System features (overview)

**System versions**

A wide variety of different systems can be implemented using the closed-loop Cut to length. Systems with rotary axis (e.g. drum-type shears) as well as linear-positioning systems, such as "flying knife" can be implemented. Only a few parameters have to be changed to adapt the software to the particular system (examples, refer to Section **Fehler! Verweisquelle konnte nicht gefunden werden.**).

**Automation**

The closed-loop cut to length is generally controlled from a higher-level supervisory automation system. This system can control the closed-loop cut to length using a few transparent system quantities, such as format length, number of cuts or operating mode. All of the values obtained, velocity profiles or statuses are internally generated, and normally do not have to be adapted.

**Operating modes**

For the automation system, there are five cutting operating modes:

- continuous cutting
- cutting program (a defined number of cuts can be made)
- single cut
- test cut (cut a sheet, i.e. make 2 cuts)
- final cut (cut the end of the material)

**Cut lengths**

The knife motion is calculated online from actual data entries and measured values. Thus, setpoints can be changed, when required, from cut to cut. This means, for example, that the cut length can be changed in operation without having to shutdown the system or generate waste.

**Cutting speed**

The cutting speed is limited by the drive technology used (especially the moment of inertias). The closed-loop cut to length operates from plant standstill up to the maximum speed. If speeds are changed when cutting, these are automatically taken into account.

**Overspeed**

When required, when cutting the knife can be moved faster than the material. The forces which occur, influence the appearance of the cutting edges and move the cut sheet away from the material. The only data which has to be input is the percentage that the knife speed has to be higher than the material speed.

**Speed profile**

The knife speed with respect to time is decisive for the cutting accuracy and for the power- and torque requirements of the drive. Various speed profiles can be selected to specify the optimum knife speed for the particular application (e.g. metal- or paper shears).

**Cutting torque**

An additional cutting torque can be entered to compensate the cutting forces within a selectable angular range.

**Cutting characteristic**

When cutting, the knife enters the material. For certain drum-type shears, the knife geometry means that the knife speed has to be changed during cutting. This correction function is specified using a characteristic (cutting characteristic: Velocity change as a function of the knife position).

**Characteristic**

In addition to the cutting characteristic, three additional characteristics are available. They are provided so that the following functions can be implemented, dependent on the position- or velocity:

KP adaptation: Speed controller gain in the drive converter as a function of the torque demand.

Friction characteristic: Generates a frictional torque component as a function of the material velocity

Moment of inertia characteristic: Generates a moment of inertia characteristic, dependent on the knife position. In this case, position-dependent changes of the knife geometry can be taken into account. These characteristics can also be used for other application-specific characteristics.

**Format controller**

For shears with rotary axis, the material feed is measured between two cuts. The closed-loop format controller can compensate deviations from the reference (setpoint) format.

**Pass marks**

When required, the closed-loop synchronous control can synchronize to pass marks, which are located on the material. The cut is then made at a defined distance from the pass mark.

**Optional functions**

The standard software package has numerous free functions, which can be used to realize application-specific open-loop control tasks. Especially for shears with linear axis, secondary, associated processes must be controlled (open-loop) (e.g. such as raising and lowering the knife, positioning, clamping the material (nip position), etc.).

**Diagnostics**

The closed-loop cut to length includes numerous monitoring- and plausibility functions. In some instances, they are permanently defined (e.g. "knife block protection", "plausibility of the knife speed"); in some instances, they can be used application-specific. Each error/fault condition can initiate an alarm or a fault to the drive converter. Faults and alarms can be signaled to the automation system.

All of the most important quantities/parameters of the closed-loop control are available as monitoring parameters and can be displayed at parameterizing devices (e.g. OP1S). Quantities/parameters which change quickly, can be connected to analog outputs, where they can then be tracked using an oscilloscope.

## 2.3 Operating modes

Generally, the sheet-cutter is controlled (open-loop) from a higher-level, supervisory automation system. This has the advantage, that many settings and inputs can be changed during operation. This also means that the required closed-loop control mode can also be defined. The available operating modes are listed in the following table. For all operating modes, it is assumed that the drive converter is operationally ready.

If several operating modes are simultaneously selected, the operating mode with the highest priority is set. Thus, a cutting operating mode can be interrupted by approaching the starting position.

A differentiation is made between "steady-state" and "latching" functions. Steady-state functions are only executed as demanded by the automation system. For latching functions, a request pulse is sufficient which then triggers all of the additional sequences.

*Table 2-1 Available operating modes (sorted according to priority; highest priority at the top)*

| Operating mode | Purpose | Prerequisites | Comments |
|---|---|---|---|
| **Local operating modes:** | | | |
| Referencing<br>(highest priority) | The knife is moved with a constant velocity. If the reference position is passed, the "knife calibrated" status is set. | • None | Steady-state function |
| Jogging 1 | The knife is moved forwards (slowly). For example, a coarse reference position can be approached. | • None | Steady-state function<br>The "knife calibrated" status is changed |
| Jogging 2 | The knife is moved backwards (slowly). For example, a fine reference position can be approached. | • None | Steady-state function<br>The "knife calibrated" status is changed |
| Approach knife change position | The knife is moved to the knife change position | • Calibrated | Steady-state function |
| Approach starting point | The knife is moved to the quiescent position | • Calibrated | Steady-state function |
| **Cutting operating modes:** | | | |
| Continuous cutting | Continuous cutting of sheets | • Calibrated<br>• starting position | Steady-state function |
| Cut program | To cut a specific number of sheets. When required, when completed, a test sheet with a specific length can be automatically cut. | • Calibrated<br>• in starting position | Steady-state function |
| Test cut | Cutting an individual sheet | • Calibrated<br>• in starting position | Latching function |
| Single cut | A cut is made at any position along the material | • Calibrated<br>• in starting position | Latching function |
| End cut | A cut is made at the end of the material web (smooth cutting edge at the end of the material) | • Calibrated<br>• in starting position | Latching function |

## 2.3.1 *Referencing*

For all cutting modes, it is assumed that the absolute knife position is known. In this case, the knife position must be calibrated (referencing). The sequences and the effect of the prioritization are shown in the following diagram. A reference approach travel is not required when an absolute value encoder is used (refer to Section 4.4.3).

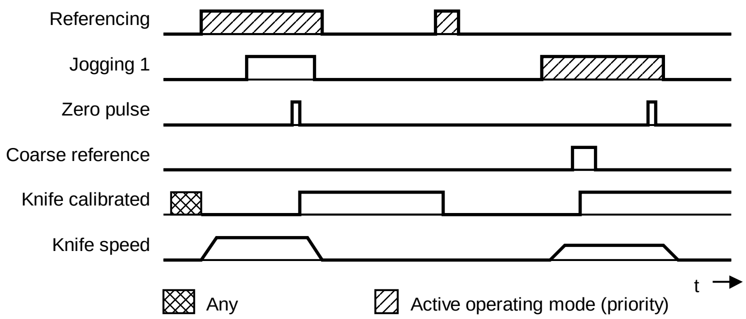



*Fig. 2-2 Sequence when referencing and jogging 1*

## 2.3.2 *Continuous cutting*

The *continuous cutting* operating mode is used to cut any number of material sheets. When the operating mode is selected, cutting starts as soon as the material enters the cutting range.

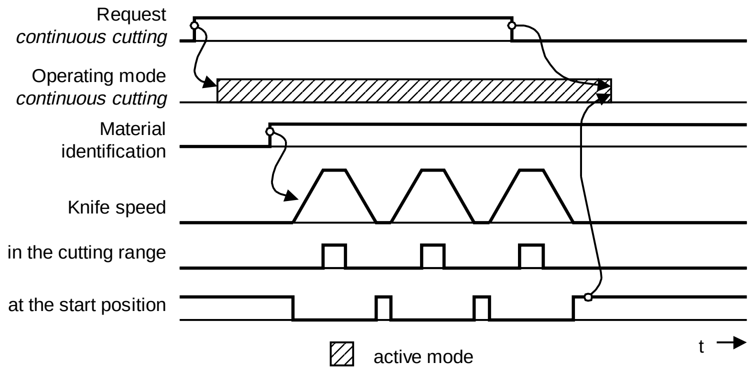



*Fig. 2-3 Timing in the "continuous cutting"operating mode*

**Steady-state operating mode**

The operating mode is terminated after the request is withdrawn, as soon as the knife is at the start position. During the last cut, a fictitious format is entered for the following sheet, which is large enough, so that the knife must wait in the quiescent position (start position) for the start of the cut. The *continuous cutting* mode is completed in this status (without this fictitious cut actually being made).

## 2.3.3 *Test cut*

For a *test cut,* only one sheet is cut. The knife drive is then stopped again. The test cut operating mode is a "latching" operating mode, i.e. the request can be withdrawn again immediately after it has been set.

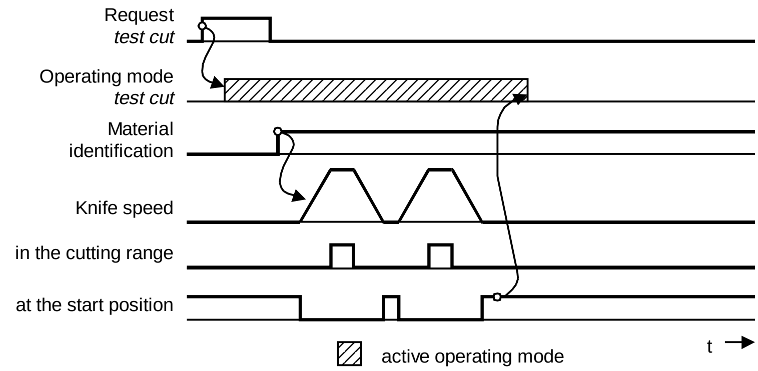



*Fig. 2-4 Timing in the "test cut" operating mode*

## 2.3.4 *Single cut*

In the single cut operating mode, a single cut is made. If material is already located in the cutting range, the cut is made immediately after the request. It is not necessary to specify a sheet length.

If the *single cut* request is set, before the start of the material web was identified, the cut position can be defined. The knife stays in the wait position until the material has approached the cutting range, corresponding to the cutting data. Thus, for example, a precise cutting edge can be established at the start of the material web.

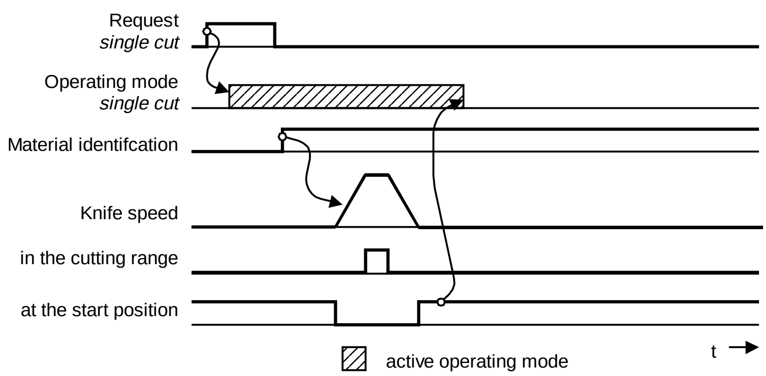



*Fig. 2-5 Timing in the "single cut" operating mode*

### 2.3.5 *End cut*

The *end cut* operating mode is used to make a cut at the end of the material web. This allows a selectable sheet length (format) to be cut from the end of the material. The setpoint for this sheet length is transferred when the operating mode is activated, which means that it must already be available. The format must be subatantial shorter than the clearance between light barrier and knife. Ther must be enough time for accelerating the knife when the web end passes the light barrier.

This function is latching, and is started with the rising edge of the request, if the end of material web identification still detects the material web at this particular instant. The cut is made with the active operating mode after the end of the material web is identified.

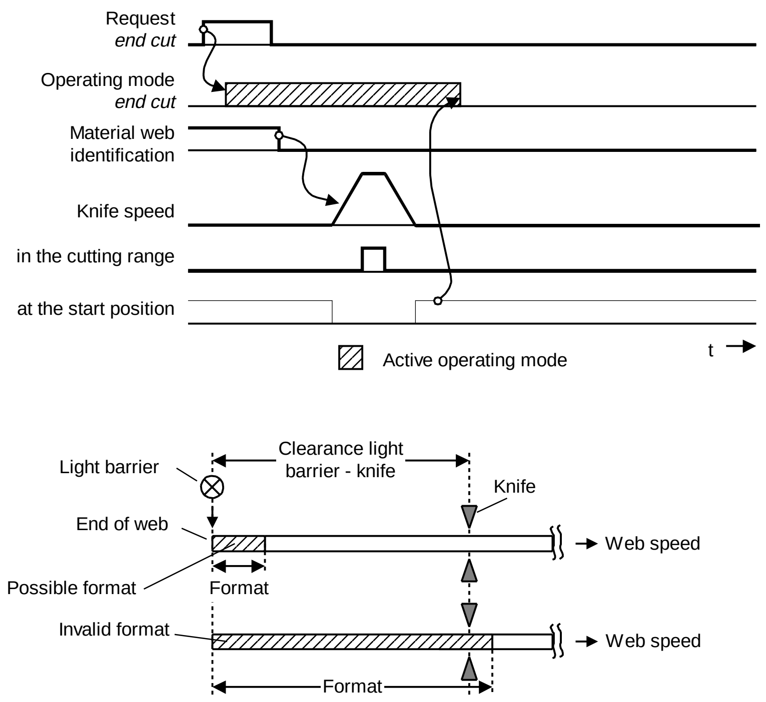



*Fig. 2-6 Timing in the "end cut" operating mode*

### 2.3.6 *Cut program*

The cut program automatically manages a larger number of cuts. The length and number of cuts is specified by the automation system. The number of sheets to be cut is transferred with the control bit *enable cut program* (refer to shear control words) and the cutting operation is started.

The timing corresponds to that shown in Fig. 2-3, only that for the cut program, the cut request is withdrawn by the internal control, and not by the automation.

**Option special test**

Optionally, directly after a cut program, a sheet with a special length can be cut. The source for the format length of the *special test* is defined using H626 (chart 190).

### 2.3.7 *Jogging 1/2*

**Jogging 1**

If *jogging 1* is activated, the knife normally moves forwards with a selectable velocity (L523). When the reference position is passed, the knife position and the *knife calibrated status* are set.

**Coarse reference**

If, when referencing, material is still in the traversing range of the knife, then it is not possible to pass through the reference position. In this case, a coarse reference switch can be evaluated, which can be located close to the knife wait position. However, the coarse reference pulse is not as precise as a zero pulse and therefore results in a lower cutting accuracy at the first cut

**Jogging 2**

For operation with *jogging 2,* the same statements are valid as for *jogging 1*. However, *jogging 2* is normally processed with a negative direction of rotation

*Table 2-2 Parameters for jogging 1 and jogging 2*

| Parameter | Chart | Significance |
|---|---|---|
| H523 | 280 | Source for jogging 1 in the shears control word |
| H524 | 280 | Source for jogging 2 in the shears control word |
| L306 | 170 | Source of the coarse pulse for the coarse referencing function |
| L308 | 170 | Source for the coarse reference - setting value for *jogging 1* |
| L311 | 170 | Coarse reference setting value *jogging 2* and a negative direction of rotation |
| L312 | 170 | Coarse reference setting value *jogging 2* and a positive direction of rotation |
| L520 - L523 | 260 | Sources to enable jogging, positive direction of rotation |
| L524 - L526 | 260 | Sources to enable jogging, negative direction of rotation |
| L523 | 260 | Speed for jogging, positive direction of rotation |
| L527 | 260 | Speed for jogging, negative direction of rotation |
| L528 | 260 | Source to select the direction of rotation when jogging |

### 2.3.8 *Approaching the knife change position*

This function is used to bring the knife to a specific mechanical position. The knife is moved to this position through the shortest possible path, whereby generally the cutting range does not have to be passed through. Cutting cannot be started from the knife change position!

# 3 Hardware components and interfaces

## 3.1 Technology module T400

| Feature | Data and explanations |
|---|---|
| Processor | 32bit / 32 MHz RISC processor with floating-point arithmetic operation |
| Cache | 4 Kbyte program, 4 Kbyte data |
| RAM | 4 Mbyte DRAM |
| Program memory | 2 Mbyte |
| Programming | Download via serial interface |
| NOVRAM | Data save function for up to 30 configurable values at power-down |
| Change memory | 32 Kbyte; to permanently save online changes (e.g. value connection changes) |
| Subrack | • Operation in the electronic boxes of the SIMOVERT MASTERDRIVES drive converters (with the exception of the Compact Plus type of construction) and SIMOREG DC Master<br>• SRT400 subrack<br>• Operation without fan up to an ambient temperature of 55°C |
| Software protection | Application-specific hardlock PALs available (<u>this is required when using the standard software package</u>) |
| Analog outputs | No. : 2<br>Range: ±10 V (12-bit resolution) |
| Analog inputs | No.: 5 (2 differential inputs; 3 non-floating inputs)<br>Range: ±10 V (12-bit resolution) |
| Digital inputs | No.: 8<br>Interrupt-capable: 4<br>Voltage: 24 V DC rated voltage |
| Digital outputs | No.: 2<br>Voltage: 24 V DC rated voltage<br>Current: max. 50 mA |
| Bi-directional inputs/ outputs (digital) | No.: 4<br>Current / voltage: refer to digital inputs/outputs |
| Pulse encoder 1 | HTL; Zero pulse and coarse pulse input;<br>alternative to the terminals, tracks A , B and zero pulse can be taken from the backplane bus of the basic drive converter (encoder emulation) |
| Pulse encoder 2 | RS422; HTL bipolar; HTL unipolar; TTL |
| Absolute value encoder | 2 synchronous-serial encoders can be connected; protocol: SSI or EnDat<br>2nd encoder uses the same terminals as the communications interface 2; this means that only one of the alternatives can be used |
| Serial interface 1 | Service functions: • Download<br>• Online operation in the CFC test mode, basic start-up<br>Alternatively: • USS (OP1S) |
| Serial interface 2 | Alternatives: • USS<br>• Peer-to-peer |
| Diagnostic LEDs | Red Internal T400 monitoring<br>Green Data transfer to the communications module<br>Yellow Data transfer to the basic drive |

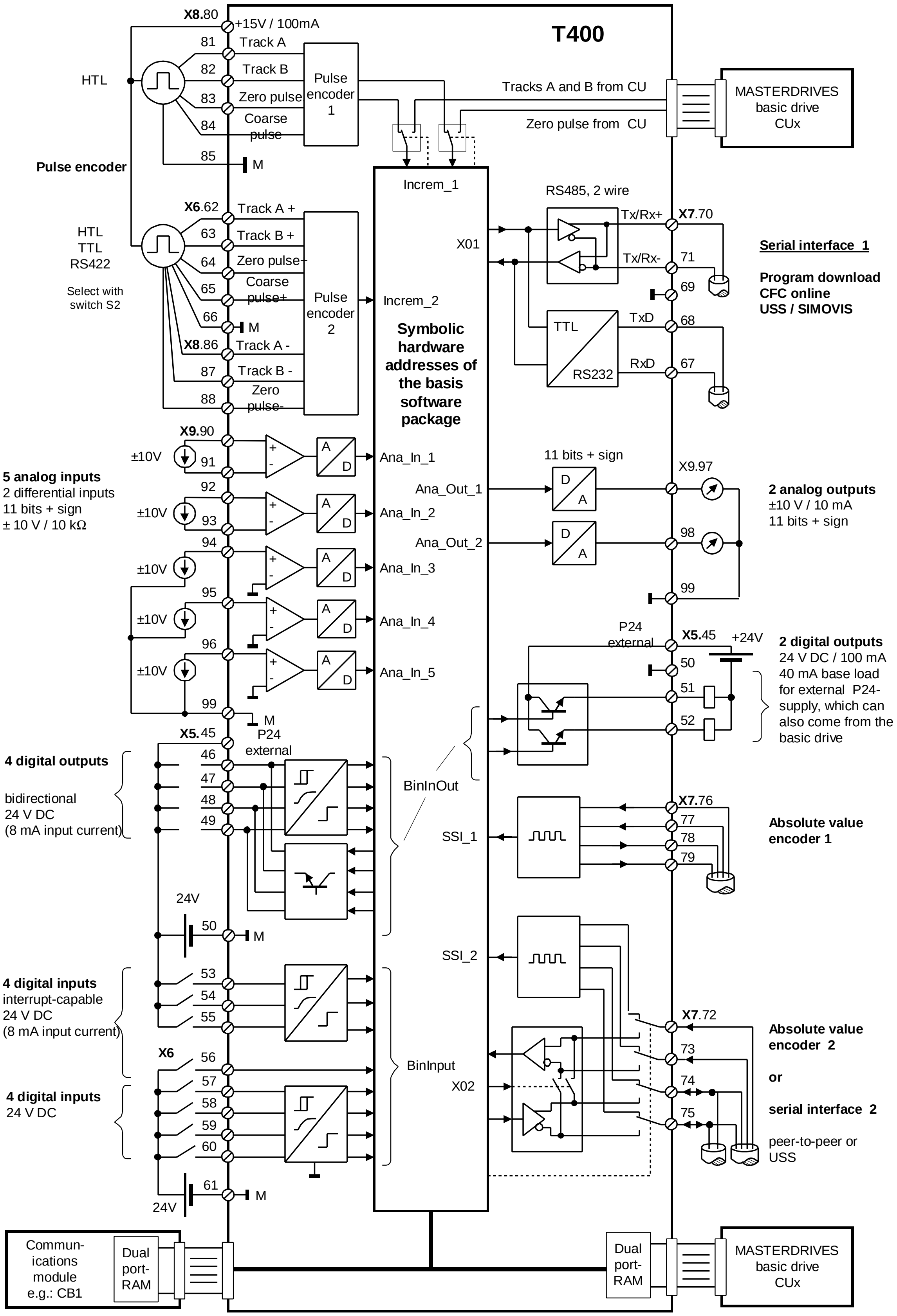



*Fig. 3-1 Layout of the terminals on the T400 technology module*

### 3.1.1 Digital inputs and outputs

**Power supply voltage**

The digital inputs and outputs of the T400 technology module use 24V signal levels. The **24 V -** power supply voltage (P24) for the digital outputs must be **externally connected**.

A maximum of 14 digital inputs are available for open-loop control functions (4 of which are bi-directional, i.e. can either be used as input or as output). All of the inputs are also available inverted. The associated parameters and connectors are obtained from function charts 100 and 110.

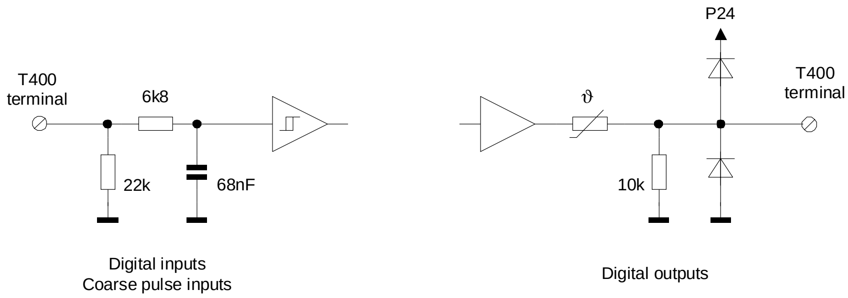



*Fig. 3-2 Circuit of the digital inputs and outputs (P24: External 24 V power supply at terminal 45)*

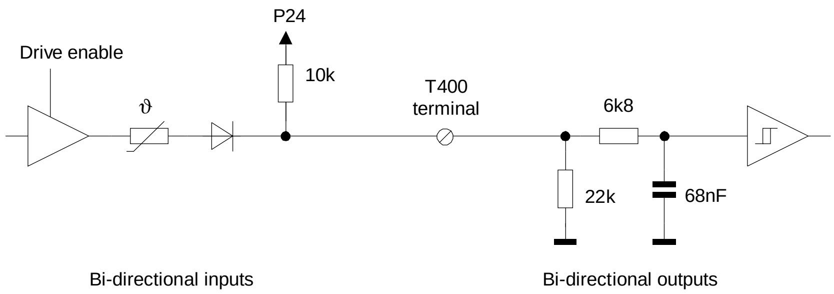



*Fig. 3-3 Circuit of bi-directional digital inputs/outputs (P24: external 24 V power supply at terminal 45)*

The inputs can be used for any open-loop control tasks. The configured pre-assignment can be taken from Table 3-2. It should be observed that the inputs are up-dated in different sampling times!

*Table 3-1 Pre-assignment of the digital outputs*

| Terminal | Sampling | Chart | Application |
|---|---|---|---|
| 46 | T1 | 100 | Fault (bi-directional terminal; driver activated with H265 = ‘1’ ) |
| 47 | T1 | 100 | Open brake (bi-dir. term.; driver activated with H266 = ‘1’ ) |
| 48 | T1 | 100 | Motor fan on (bi-dir. term.; driver activated with H267 = ‘1’ ) |
| 51 | T1 | 100 | Raise knife / shears |
| 52 | T1 | 100 | Lower knife / shears |

*Table 3-2 Pre-assignment of the digital inputs*

| Terminal | Sampling time | Chart | Application |
|---|---|---|---|
| 53 | T3 | 280 | External fault / alarm 1 in the shears control word 2 |
| 54 | T3 | 280 | Jogging 1 in the shears control word 2 |
| 55 | T3 | 280 | Jogging 2 in the shears control word 2 |
| 56 inverse | T3 | 280 | External fault / alarm 2 in the shears control word 2 |
| 58 | T3 | 280 | Coarse reference in the shears control word 2 |
| 64 | (Hardware) | 530 | Pass mark detecting respectively zero pulse shear drive (rotary axis) |
| 65 | T1 | 180<br>240 | Light barrier signal to set the reference position<br>Light barrier signal to input the cutting torque |

## 3.1.2 Analog inputs and outputs

**Inputs**

The analog inputs are scaled in the factory setting, so that a terminal voltage of **5 V** is emulated internally as **1.0**. This pre-setting is changed using scaling factors and offsets. The following is valid for analog inputs:

**Scaling**

Analog value = terminal voltage · scaling factor / 5 V - offset

The integration of analog inputs into the standard software package and the associated parameters and connectors is shown in function chart 90.

Generally, a smoothing element is connected after the analog inputs in the software. This smoothing function can be de-activated by setting the filter time constant to 0 ms. The control can set the output signal to zero (inhibit).

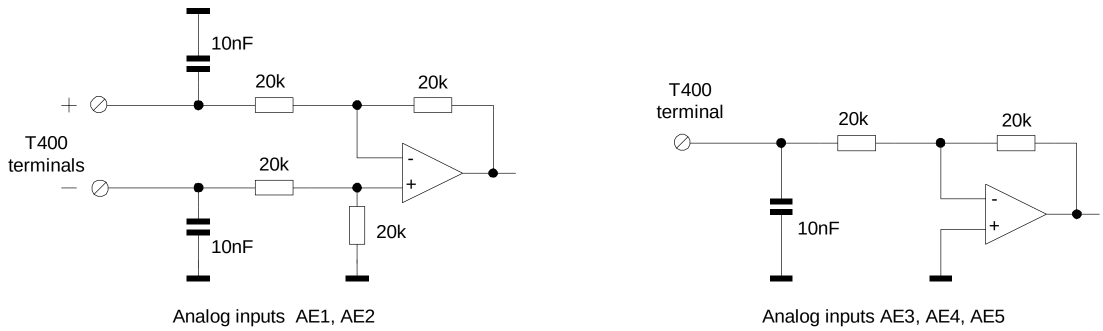



*Fig. 3-4 Analog input circuit*

**Outputs**

The T400 has two analog outputs, which are processed in the fastest sampling time (T1). The output quantity is selected per parameter. The outputs have a filter which can be parameterized and which the control can set to 0 in operation (inhibit). The associated function chart is number 95.

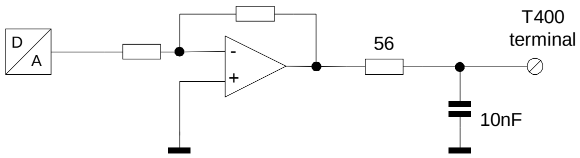



*Fig. 3-5 Circuit of the analog output*

The outputs can be scaled. For the factory setting, for 1.0, 5 V is output. The output voltage U is obtained as follows:

U = ( value + offset ) · scaling factor · 5 V

*Table 3-3 Terminal assignment, analog input, T400 module*

| Terminals | Sampling time | Scaling | Offset | Filter time constant | Source inhibit | Connector | Value, smooth |
|---|---|---|---|---|---|---|---|
| 90 / 91 | T3 | H210 | H211 | H212 | H213 | 3214 | d214 |
| 92 / 93 | T3 | H215 | H216 | H217 | H218 | 3219 | d219 |
| 94 / 99 | T4 | H275 | H276 | H277 | H278 | 3279 | d279 |
| 95 / 99 | T4 | H280 | H281 | H282 | H283 | 3284 | d284 |
| 96 / 99 | T4 | H285 | H286 | H287 | H288 | 3289 | d289 |

*Table 3-4 Terminal assignment analog inputs, T400 module*

| Terminal | Select source | Output value | Source for inhibit | Scaling factor | Offset | Filter time constant |
|---|---|---|---|---|---|---|
| 97 / 99 | H220 | d223 | H221 | H161 | H160 | H222 |
| 98 / 99 | H226 | d229 | H227 | H163 | H162 | H228 |

### 3.1.3 Pulse encoders

**Pulse encoders** with **two tracks, offset by 90°** with zero pulse are required. If the pulse encoder for the knife position is connected to the basic drive (CU) then its track signals are transferred from the CU to the T400 via the common backplane bus (Fig. 2-1). In this particular case, other encoder types can also be used - e.g. high-resolution encoders. It is important that the encoder module of the CU has an incremental encoder emulation function, so that the encoder, from the perspective of the T400 acts like an incremental encoder.

The selection and **encoder mounting** are decisive for the cutting accuracy of the system! Thus, the following points must be taken into account:

**Knife position**

The position encoder for the knife should be mounted directly at the knife and not at the drive motor. A gearbox located between the motor and knife results in inaccuracy as a result of the gearbox play. The zero pulse must always be output at precisely the same knife position.

**Material web position**

The material web position is sensed using a wheel with incremental encoder, which is driven by the material which is to be cut. As a result of slip between the feed drive and material, significant measuring inaccuracy can result when sensing the position using the angle of the feed drive.

**Measured value resolution**

The resolution of the material position sensing must be 10 x higher than the required cutting accuracy. This means, that if a cutting accuracy of 1 mm is to be achieved, then the encoder must provide at least 10 position encoder increments for a 1 mm material feed. For the position sensing, each edge of the position tracks is evaluated, whereby the position resolution is quadrupled. (A 1024 pulse encoder generates 4096 edges per revolution).
Thus, a position encoder increment is the same as the 1/(4 pulse number)th part of a revolution.

**Example**

| | |
|---|---|
| Required cutting accuracy: | 0.5 mm |
| Wheel diameter: | 200 mm |
| Wheel circumference: | 628 mm |
| Edges per revolution: | 10 · 628 / 0.5 = 12566 |
| Min. pulse number of the encoder: | 12566 / 4 = 3142 |
| Selected encoder pulse number: | 4096 pulses/revolution |

**Encoder power supply**

A 15 V (max. 100 mA) is available as encoder power supply from the T400 module.

**Screening**

The pulse encoder cable and the cables for the synchronizing pulses must be screened. The cable screen must be connected with ground at both ends, possibly using clamps and through a low-impedance connection. This is especially important, if these signals are received from proximity- or switching contacts.

The electrical input circuit of the encoder is shown in Fig. 3-6. If an HTL encoder is connected at encoder 2, the inverting inputs are switched to ground.

The speed sensing is adapted at the encoder using the parameters listed in the following tables.

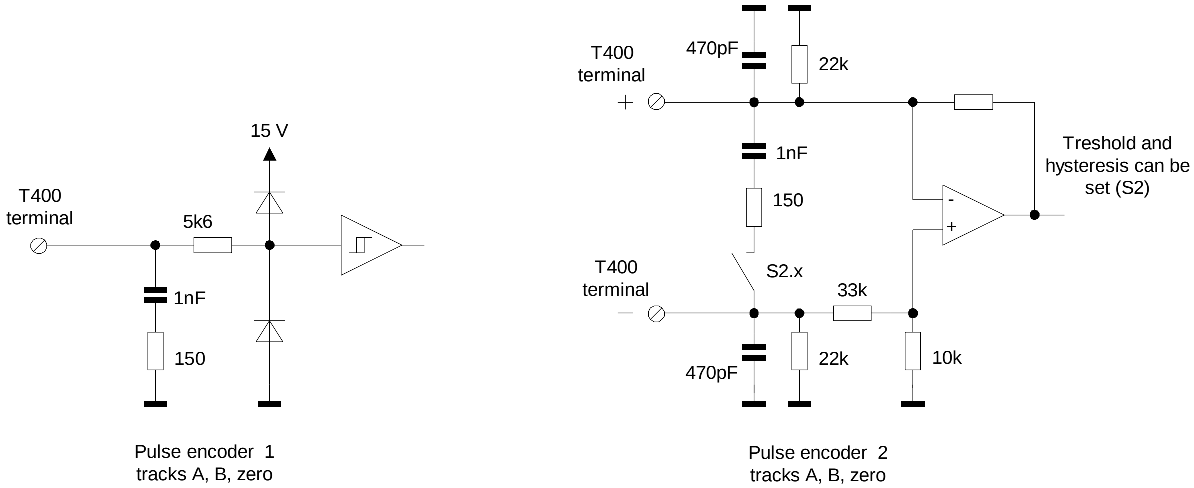



*Fig. 3-6 Incremental encoder connection circuit*

*Table 3-5 Incremental encoder inputs of the T400: Terminal assignment and switch settings for various encoder types*

| | Encoder 1 | Encoder 2 | | | |
|---|---|---|---|---|---|
| | HTL | RS422 | HTL | TTL | HTL ±3V |
| Track A+ or track A | 81 | 62 | 62 | 62 | 62 |
| Track A- | - | 86 | - | - | - |
| Track B+ or track B | 82 | 63 | 63 | 63 | 63 |
| Track B- | - | 87 | - | - | - |
| Synchronizing pulse N+ | 83 | 64 | 64 | 64 | 64 |
| Synchronizing pulse N **-** | 66 | 88 | - | - | - |
| P15 - output to the encoder power supply 15 V | 80 | 80 | 80 | 80 | 80 |
| Ground | 85 | 66 | 66 | 66 | 66 |
| Switch S2.1 | | ON | OFF | ON | OFF |
| Switch S2.2 | | ON | OFF | ON | OFF |
| Switch S2.3 | | ON | OFF | OFF | ON |
| Switch S2.4 | | ON | OFF | ON | OFF |
| Switch S2.5 | | ON | OFF | OFF | ON |

*Table 3-6 Parameters to set the incremental encoder*

| Param. | Chart | Significance | Details |
|---|---|---|---|
| H400 | 120 | Encoder pulses/revolution for the knife position (encoder 1) | |
| H407 | 120 | Mode, encoder 1<br>(refer to Table 3-7) | • Source of the encoder tracks<br>• Encoder type<br>• Filtering the track signals<br>• Defining the standstill limit<br>• Behavior when setting the position |
| H408 | 120 | Synchronization settings for encoder 1 | • Position correction for a zero pulse<br>• Coarse pulse evaluation |
| H409 | 120 | Max. pulses, encoder 1; if this value is not equal to 0, then the position is reset after H409 position pulses. | |
| H420 | 130 | Encoder pulses/revolution for the knife position (encoder 2) | |
| H429 | 130 | Mode, encoder 2<br>(refer to Table 3-7) | • Encoder type<br>• Filtering the track signals<br>• Defining the standstill limit<br>• Behavior when setting the position |
| H428 | 130 | Synchronization settings, encoder 2 | • Position correction for a zero pulse<br>• Coarse pulse evaluation |
| H430 | 130 | Maximum pulses, encoder 2; if this value is not equal to zero, the position is reset after H430 position pulses. | |

*Table 3-7 Incremental encoder sensing modes (factory setting, **highlighted**)*

| Bit(s) | Designation | Values | Significance |
|---|---|---|---|
| 0 | Encoder type | **0**<br>1 | Type 1: Two encoder tracks, shifted through 90°<br>Type 2: One track for each direction of rotation (do not use!) |
| 3 ... 1 | Filter for encoder tracks<br>(for encoder type 1) | 000<br>001<br>010<br>011<br>100<br>otherwise | No filter<br>500 ns<br>2 µs<br>8 µs<br>16 µs<br>no permissible |
| 4 | Behavior when setting the position | **0**<br>1 | Position = Setting value<br>Position = Position - setting value |
| 5 | Behavior when setting the position difference | **0**<br>1 | Pos. diff. = position difference setting value<br>Pos. diff. = pos. diff. - pos. diff. setting value |
| 6 | Source of the encoder tracks (this can only be selected for encoder 1) | 0<br>**1** | from terminals 81, 82 of the T400<br>from the basic drive (backplane bus) |
| 7 | Source of the zero pulse track for encoder 1 | 0<br>**1** | from terminals 83 of the T400<br>from the basic drive converter (backplane bus) |
| 15 ... 8 | Measuring interval for standstill identification in cycles: After 4 + selected value without position encoder change, the speed goes to 0 | 0x01<br>**0x7F** | (4 + 1) cycles without position change<br>(4 + 127) cycles without position change |

*Table 3-8 Synchronizing modes of the incremental encoder sensing (factory setting **highlighted**)*

| Bit(s) | Designation | Values | Significance |
|---|---|---|---|
| 0 | Synchronization | **0**<br>1 | Via zero pulse<br>Via trigger signal (not for T400 !) |
| 1 | Behavior for a zero pulse | **0**<br>1 | Position = setting value<br>Position = position - setting value |
| 3 ... 2 | Not assigned | | |
| 6 ... 4 | Coarse pulse evaluation<br>(Modes, refer to Fig. 3-7 ) | **000**<br>001<br>010<br>011<br>100<br>101 | No coarse pulse evaluation<br>Mode 1 (no coarse pulse evaluation)<br>Mode 2<br>Mode 3<br>Mode 4<br>Mode 5 |
| 15 ... 7 | Not assigned | | |

**Coarse pulse evaluation**

Coarse pulses are used to suppress undesirable synchronizing signals. For example, faults/disturbances can be suppressed or only certain synchronizing pulses evaluated by combining coarse- and fine pulses. 5 different cases are taken into account. In the default setting, the synchronizing pulses are used independently of the associated coarse pulses (mode 1).

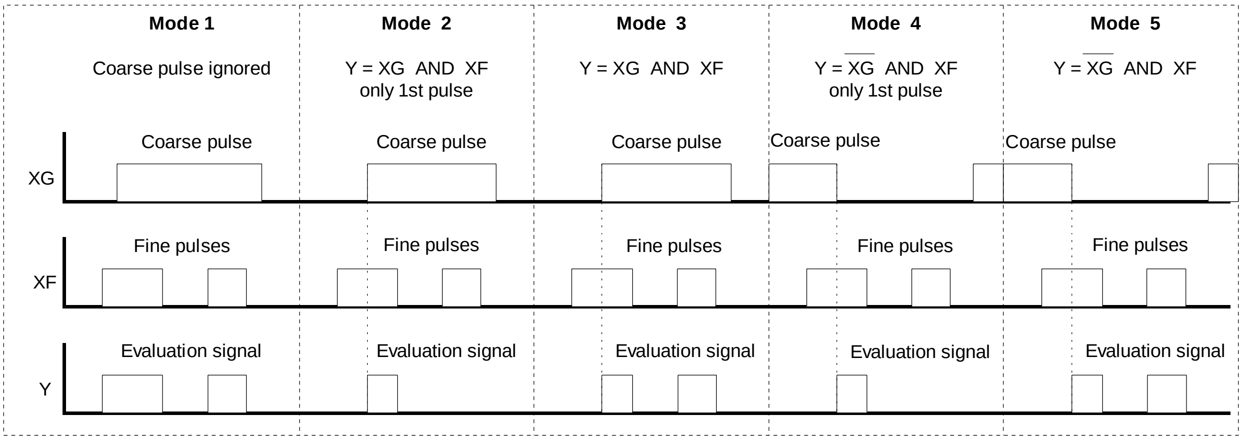



*Fig. 3-7 Operating modes for the coarse pulse evaluation (fine pulses are the zero pulses)*

## 3.1.4 Communication interfaces

### 3.1.4.1 Peer-to-peer interface

The standard software package includes a peer-to-peer interface, which is used for fast data transfer with other modules, e.g. an additional T400. This interface has the following pre-setting:

*Table 3-9 Data to the peer-to-peer interface*

| Characteristic | Param. | Value |
|---|---|---|
| Enable communications | L066 | 0 |
| Baud rate | L060 | 19200 baud |
| Monitoring time limit in operation | L067 | 100 ms |
| Monitoring time limit after power-up | L077 | 20 s |
| Number of process data, receive and send | constant | each 5 PZD |

The other parameters and connectors are described in function chart 780.

**Caution**

In order to eliminate data transfer faults, the terminating resistors of the interface used, must be switched-in (switch S1/3 to S1/6; refer to [4]).

### 3.1.4.2 USS slave interface

Serial interface 1 (RS232 / RS485) can be used as an alternative for parameterization or as diagnostics interface. The parameterization is provided for the special case that the T400 is operated in the SRT400. When used in the basic drive, parameterization is realized via the basic drive. The following settings are required for USS slave operation (refer to function chart 770):

*Table 3-10 Settings for USS slave operation (factory = factory setting)*

| Involves | Value | Factory setting | Significance |
|---|---|---|---|
| L920 | 1 | 0 | Enable the USS slave |
| L921 | | 9600 | Baud rate (OP1S : 9600 or 19200) |
| L922 | | 0 | Slave address on the USS bus |
| H923 | | 0 | 0: RS485 (OP1S)<br>1: RS232 (SIMOVIS) |
| S1/8 on T400 | ON | OFF | Changeover from online operation (CFC, basic commissioning) to USS.<br>This only becomes effective after power-down/reset of the T400 |

**Caution:**

It is not possible to simultaneously use USS and online operation. USS operation is not possible if parameterization was incorrect. This means that the error can only be reversed if online operation is selected and, e.g. the fault is reversed using the basic commissioning function. Operation with OP1S is only possible from the OP1S version V2.2.

#### 3.1.4.3 Diagnostics interface

A PC can be connected to the serial interface 1 (RS232). The interface can be used with the service commissioning/ TELEMASTER of the CFC in the test mode. This allows values and interconnections to be changed.

The baud rate is **19200 baud**.

*Table 3-11 Terminals of interface X01 on the T400 (RS232)*

| T400 | | PC | |
|---|---|---|---|
| Terminal | Function | 9 pin | 25 pin |
| 67 | RxD | 3 | 3 |
| 68 | TxD | 2 | 2 |
| 69 | Ground | 5 | 7 |

### 3.1.5 Cycle times (tasks)

The sheet-cutter software is cyclically processed. 5 different cycle times are available, in each one of which a processing sequence occurs (task). The individual functions, are, depending on the priority from a control perspective, embedded in faster or slower tasks.

In the following text, no timing data is specified, but instead a reference is only made to the processing task.

*Table 3-12 Software cycle times*

| Task | Sheet-cutter / cut to length | Tasks which have been executed (examples) |
|---|---|---|
| T1 | 1.6 ms | Closed-loop position control<br>Setpoint input for the CU<br>Cam group<br>Pass mark detecting |
| T2 | 6.4 ms | Presently not used |
| T3 | 12.8 ms | Open-loop control<br>Communications with automation<br>Free function blocks (exceptions see charts 425ff) |
| T4 | 51.2 ms | Slow control tasks and monitoring functions |
| T5 | 204.8 ms | Parameter handling |

## 3.2 Communications module

The communications module forms the interface to the higher-level automation of the closed-loop sheet-cutter control. Generally, a PROFIBUS module CBP is inserted at slot G in the electronics box of the drive converter (lower center slot). Other communication modules are possible, as long as they behave like a CBP with respect to the T400 (e.g. CB1). All of the CBP settings (e.g. bus address) are realized via the parameters of the CU.

The automation can read and change the process data (PZD) and parameters (PKW) on the T400 via the communications network.

The telegram from the automation system comprises 4 words for parameterization and up to 10 PZD. The pre-assignment is specified in the following tables.

**Monitoring:**

Regular reception at the communications interface is monitored (chart 660). If a fault/error develops, alarms or faults can be output.

**Pre-setting:**

At the latest after 20 s (H929) after power-up, the first valid telegram must be received. In operation, a new telegram must be received every 100 ms (H926).

*Table 3-13 Telegram from the automation system to the T400 (* optional; not required for operation respectively fixed value used as setpoint)*

| Word | Name | Significance/assignment | Chart |
|---|---|---|---|
| 1 | PKE | Parameter ID | |
| 2 | IND | Index | |
| 3 | PWE (H) | Parameter value (high word) | |
| 4 | PWE (L) | Parameter value (low word) | |
| 5 | PZD1 from CB | Control word 1 for CU (CB_CTW1; Table 3-16) | 670, 680 |
| 6 | PZD2 from CB | * Master velocity, material web | 670 |
| 7 | PZD3 from CB | * Factor, overspeed | 670, 265 |
| 8 | PZD4 from CB | * Control word 2 | 670 |
| 9 | PZD5 from CB | * Acceleration | 670 |
| 10 | PZD6 from CB | * Sheet length (format setpoint) | 670, 190 |
| 11 | PZD7 from CB | * Cutting force | 670, 240 |
| 12 | PZD8 from CB | * Removal up to the cut | 670 |
| 13 | PZD9 from CB | * Number of cuts | 670, 300 |
| 14 | PZD10 from CB | Shear control word (SCTW; Table 3-15 ) | 670, 270 |

*Table 3-14 Telegram from the T400 to the automation system*

| Word | Name | Significance/assignment | Chart |
|---|---|---|---|
| 1 | PKE | Parameter ID | |
| 2 | IND | Index | |
| 3 | PWE (H) | Parameter value (high word) | |
| 4 | PWE (L) | Parameter value (low word) | |
| 5 | PZD1 CB out | Status word 1 (Table 3-17) | 700, 690 |
| 6 | PZD2 CB out | Material velocity (actual value) | 700 |
| 7 | PZD3 CB out | Speed actual value, knife | 700, 120 |
| 8 | PZD4 CB out | Status word 2 (Table 3-18) | 700, 690 |
| 9 | PZD5 CB out | Current actual value | 700, 610 |
| 10 | PZD6 CB out | Torque actual value | 700, 610 |
| 11 | PZD7 CB out | Format length, actual sheet (actual format value) | 700, 130 |
| 12 | PZD8 CB out | No pre-assignment (default) | 700 |
| 13 | PZD9 CB out | No pre-assignment (default) | 700 |
| 14 | PZD10 CB out | Shear status word | 700, 520 |

*Table 3-15 CB shear control word (chart 680)*

| Bit | Name | Control bit | Significance for '1' |
|---|---|---|---|
| 0 | CB SCTW1.0 | Not defined | |
| 1 | CB SCTW1.1 | Continuous cut | Continuous cutting requested |
| 2 | CB SCTW1.2 | Test cut | Test cut requested |
| 3 | CB SCTW1.3 | Single cut | Single cut requested |
| 4 | CB SCTW1.4 | Length setpoint valid | Requested length setpoint is valid |
| 5 | CB SCTW1.5 | Light barrier, start of web | Material web detected by the optical barrier |
| 6 | CB SCTW1.6 | Referencing | Request, calibrate knife |
| 7 | CB SCTW1.7 | Enable storing | Store value to non-volatile memory |
| 8 | CB SCTW1.8 | Approach starting position | Request, approach starting position |
| 9 | CB SCTW1.9 | Store actual value | Storing enabled |
| 10 | CB SCTW1.10 | Enable cutting program | Cutting program is enabled;<br>the length setpoint is transferred with a '0'⇒'1' edge |
| 11 | CB SCTW1.11 | Crop cut enable | For the start of the material web, the 1st cut is made with the crop length (special format, refer to Chart 60) |
| 12 | CB SCTW1.12 | End cut | Request, end cut |
| 13 | CB SCTW1.13 | Not defined | |
| 14 | CB SCTW1.14 | Approach knife change position | Request to move the knife into the change position |
| 15 | CB SCTW1.15 | Option, special test | After the cut program has been completed, a sheet is cut with a special length |

*Table 3-16 CB control word 1 (inputs for CU; refer to Chart 680)*

| Bit | Name | '0' | '1' |
|---|---|---|---|
| 0 | CB Control W1.0 | Stop | No stop |
| 1 | CB Control W1.1 | Electrical OFF | No electrical OFF |
| 2 | CB Control W1.2 | Fast stop | No fast stop |
| 3 | CB Control W1.3 | No inverter enable | Inverter enable |
| 4 | CB Control W1.4 | Set ramp-function generator to 0 | Enable ramp-function generator |
| 5 | CB Control W1.5 | Hold ramp-function generator | Start ramp-function generator |
| 6 | CB Control W1.6 | Inhibit setpoint | Enable setpoint |
| 7 | CB Control W1.7 | | Acknowledge fault |
| 8 | CB Control W1.8 | No jogging 1 | Jogging 1 |
| 9 | CB Control W1.9 | No jogging 2 | Jogging 2 |
| 10 | CB Control W1.10 | Not permissible !! | Control from the automation |
| 11 | CB Control W1.11 | Positive direction of rotation inhibited | Positive direction of rotation enabled |
| 12 | CB Control W1.12 | Negative direction of rotation inhibited | Negative direction of rotation enabled |
| 13 | CB Control W1.13 | Motorized potentiometer, not raised | Motorized potentiometer, raised |
| 14 | CB Control W1.14 | Motorized potentiometer, not lowered | Motorized potentiometer, lowered |
| 15 | CB Control W1.15 | External fault | NO external fault |

*Table 3-17 Status word 1 (status for CB; refer to Chart 690)*

| Bit | Assignment for '1' |
|---|---|
| 0 | Ready to power up from the CU |
| 1 | Ready from the CU |
| 2 | Inverter enabled from the CU |
| 3 | Fault from CU effective |
| 4 | Electrical OFF from CU |
| 5 | No fast stop from CU |
| 6 | Power-on inhibit from CU |
| 7 | Alarm from CU effective |
| 8 | Setpoint-actual value deviation identified by CU |
| 9 | '1' |
| 10 | Knife in motion |
| 11 ... 15 | '0' |

*Table 3-18 Status word 2 (status for CB; refer to chart 690)*

| Bit | Assignment for '1' |
|---|---|
| 0 ... 5 | '0' |
| 6 | Torque limit reached (reference torque > maximum torque ) |
| 7 ...15 | Inverter enabled from the CU |

## 3.3 Interface to the basic drive (CU)

The T400 and the CU communicate via a dual port RAM (DPRAM). Parameters and PZD are transferred. In this particular application, the T400 receives 16 PZD and sends 8 PZD (Table 3-20 and Table 3-19). The CU and T400 monitor communications. If data transfer (communications) is interrupted for longer than 200 ms, the CU signals fault F082. The yellow LED is bright on the T400 if communications between the T400 and CU are OK. Communications is monitored by the standard software package (Chart 600).

**WARNING** After T400 has been reset in operation (e.g. via CFC online), the T400 re-establishes communications to the CU and controls the yellow LED. For the CUs presently being used, the channel to the T400 remains inhibited, also after fault F082 has been acknowledged. This means that data is not transferred from the CU to the T400.

Remedy: Restart the CU (shutdown the voltage)

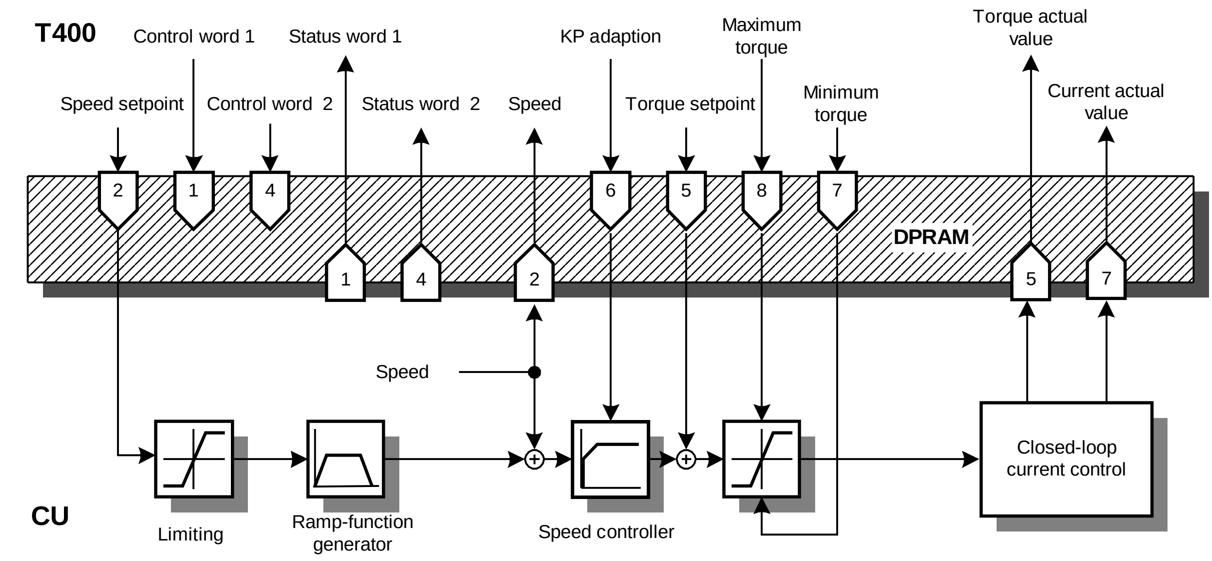



*Fig. 3-8 Process data transfer between the T400 and CU via DPRAM*

*Table 3-19 Process data from the T400 to the basic drive*

| Word | Name | Significance / assignment | Chart |
|---|---|---|---|
| 1 | PZD1 CU | Control word 1 (refer to Chart 630; Table 3-16) | 640, 630 |
| 2 | PZD2 CU | Speed setpoint (referred to the rated speed) | 640, 260 |
| 3 | PZD3 CU | Not assigned | 640 |
| 4 | PZD4 CU | Control word 2 (refer to Chart 630; ) | 640, 630 |
| 5 | PZD5 CU | Torque setpoint | 640, 240 |
| 6 | PZD6 CU | KP adaptation | 640, 450 |
| 7 | PZD7 CU | Reserved for the minimum torque | 640 |
| 8 | PZD8 CU | Reserved for the maximum torque | 640 |

*Table 3-20 Communications from the basic drive to the T400*

| Word | Name | Significance / assignment | Chart |
|---|---|---|---|
| 1 | PZD1 from CU | Status word 1 CU (Table 3-21) | 610, 620 |
| 2 | PZD2 from CU | Speed actual value (refer to the reference speed) | 610, 500 |
| 3 | PZD3 from CU | Not assigned | 610 |
| 4 | PZD4 from CU | Status word 2 CU ( Table 3-22) | 610, 620 |
| 5 | PZD5 from CU | Torque actual value (referred to the reference torque) | 610, 700, 490 |
| 6 | PZD6 from CU | Not assigned | 610 |
| 7 | PZD7 from CU | Current actual value (referred to the reference current; for optional usage) | 610, 700 |
| 8 | PZD8 from CU | Not assigned | 610 |
| 9 | PZD9 from CU | Not assigned | 610 |
| 10 | PZD10 from CU | Not assigned | 610 |
| 11 | PZD11 from CU | Not assigned | 610 |
| 12 | PZD12 from CU | Not assigned | 610 |
| 13 | PZD13 from CU | Not assigned | 610 |
| 14 | PZD14 from CU | Not assigned | 610 |
| 15 | PZD15 from CU | Not assigned | 610 |
| 16 | PZD16 from CU | Not assigned | 610 |

*Table 3-21 Status word 1 from the basic drive (chart 620)*

| Bit | Name | '0' | '1' |
|---|---|---|---|
| 0 | CU status 1.0 | Not ready to power-up | Ready to power-up |
| 1 | CU status 1.1 | Not ready | Ready |
| 2 | CU status 1.2 | Pulses inhibited | Operation |
| 3 | CU status 1.3 | No fault | Fault (pulse inhibit) |
| 4 | CU status 1.4 | OFF2 effective | No OFF2 present |
| 5 | CU status 1.5 | Fast stop effective (OFF3) | No fast stop |
| 6 | CU status 1.6 | Power-up possible | Power-up inhibit |
| 7 | CU status 1.7 | No alarm present | Alarm present |
| 8 | CU status 1.8 | Setpoint-actual value deviation | No setpoint-actual value deviation |
| 9 | CU status 1.9 | ⇒ May not exist !! | PZD control |
| 10 | CU status 1.10 | Comparison value reached | Comparison value not reached |
| 11 | CU status 1.11 | No undervoltage | Fault, undervoltage condition |
| 12 | CU status 1.12 | Request, main contactor not energized | Request, energize main contactor |
| 13 | CU status 1.13 | Ramp-function generator not active | Ramp-function generator active |
| 14 | CU status 1.14 | Negative speed setpoint | Positive speed setpoint |
| 15 | CU status 1.15 | (Reserve) | (Reserve) |

*Table 3-22 Status word 2 from the basic drive (chart 620)*

| Bit | Name | '0' | '1' |
|---|---|---|---|
| 0 | CU status 2.0 | Restart-on-the-fly not active or energization ended | Restart-on-the-fly or energization active |
| 1 | CU status 2.1 | (Reserve) | (Reserve) |
| 2 | CU status 2.2 | No overspeed | Overspeed |
| 3 | CU status 2.3 | No external fault 1 present | External fault 1 |
| 4 | CU status 2.4 | No external fault 2 present | External fault 2 |
| 5 | CU status 2.5 | No external alarm present | External alarm |
| 6 | CU status 2.6 | No overload alarm | Alarm, drive converter overload |
| 7 | CU status 2.7 | No fault, drive converter overtemperature | Fault, drive converter overtemperature |
| 8 | CU status 2.8 | No alarm, drive converter overtemperature | Alarm, drive converter overtemperature |
| 9 | CU status 2.9 | No fault, motor overtemperature | Fault, motor overtemperature |
| 10 | CU status 2.10 | No alarm, motor overtemperature | Alarm, motor overtemperature |
| 11 | CU status 2.11 | (Reserved) | (Reserved) |
| 12 | CU status 2.12 | No fault, motor stalled | Fault, motor stalled |
| 13 | CU status 2.13 | Bypass contactor not energized | Bypass contactor energized |
| 14 | CU status 2.14 | (Reserved) | (Reserved) |
| 15 | CU status 2.15 | Pre-charging not active | Pre-charging active |

*Table 3-23 Control word 2 for the basic drive (chart 630)*

| Bit | Significance | Assignment |
|---|---|---|
| 0 | Select function data set, bit 0 | '0' |
| 1 | Select function data set, bit 1 | '0' |
| 2 | Reserve | '0' |
| 3 | Reserve | '0' |
| 4 | Select fixed setpoint, bit 0 | '0' |
| 5 | Select fixed setpoint, bit 1 | '0' |
| 6 | Reserve | '0' |
| 7 | Enable restart-on-the-fly | '1' |
| 8 | Enable speed controller droop | '1' |
| 9 | Enable CU speed controller | Controller enable |
| 10 | External fault 2 | '0' |
| 11 | No master drive | '1' |
| 12 | No external alarm 1 | '0' |
| 13 | No external alarm 2 | '1' |
| 14 | Select BICO data set 2 | '1' |
| 15 | Checkback signal, main contactor | '0' |

### 3.3.1 Faults and alarms

A number of monitoring- and diagnostic functions are implemented in the standard software package, and the monitoring result is connected to a fault word (d968). Using masks, it is defined whether a fault bit is signaled to the CU as alarm (H967), fault (H966) or not at all (chart 530).

The alarms or fault, signalled to the CU are displayed (PMU), e.g.: „A099“ or „F120“. Further, the drive converter shuts down when a fault is present.

*Table 3-24 Bits of the fault word and associated faults and alarms (chart 530)*

| Bit | Alarm | Fault | Fault source | Possible causes |
|---|---|---|---|---|
| 0 | A097 | F116 | Communications CB | • No/defective communications module<br>• Incorrect bus address (CU P918)<br>• Incorrect module type configured for the bus master |
| 1 | A098 | F117 | Communications to CU | Old CU type (e.g.: CU2) ? ⇒ log-on T400 |
| 2 | A099 | F118 | Not assigned | |
| 3 | A100 | F119 | User fault 1 | Assign application-specific user fault |
| 4 | A101 | F120 | User fault 2 | ‘’ ‘’ |
| 5 | A102 | F121 | Knife position < minimum value | • Knife pulse encoder or reference incorrectly set<br>• Setting function, knife position sets negative position values<br>• Limit value not adapted to the application |
| 6 | A103 | F122 | Overspeed positive (knife) | • Check limit value L101, L102<br>• Check speed normalization on T400 / CU |
| 7 | A104 | F123 | Overspeed negative (knife) | • Check limit value L101, L102<br>• Check speed normalization on T400 / CU |
| 8 | A105 | F124 | Knife drive blocked in spite of setpoint speed and torque present | |
| 9 | A106 | F125 | Pulse encoder fault (speed measured values from T400 and CU different) | Incorrect speed normalization ; check the plant/system geometry, pulse number, encoder for T400 and CU correct? |
| 10 | A107 | F126 | External fault 1 | Assigned application-specific |
| 11 | A108 | F127 | External fault 2 | Assigned application-specific |
| 12 | A109 | F128 | Knife position > max. value | Check limit value! For linear axis, high limit values possible |
| 13 | A110 | F129 | Material position < min. value | • Long format (H111) selected too small<br>• Check functions for setting position values<br>• Correct position several times per sheet |
| 14 | A111 | F130 | Fault, TR encoder | Encoder 1 from type TR absolute value encoder? |
| 15 | A112 | F131 | Not used | |

# 4 Function description

## 4.1 Normalization operations

Process data are generally transferred as 16-bit fixed-point values. If the resolution is not sufficient in certain cases, a 32-bit fixed point value can be used. When converting from the PZD into floating-point values, the normalization factor 1.0 is used in the factory setting. When PZD is output, the inverse conversion is made from floating point to a fixed-point value. The normalization operations can be individually changed using parameters. Generally, control- and standard word are available as 16 bit values.

The closed-loop control related core of the closed-loop cut to length operate with per unit quantities.

*Table 4-1 Normalization of the process data*

| Type | Resolution | Range | Conversion into floating point values |
|---|---|---|---|
| N2 | 16 bit | -32768 ... 32767 | $\frac{PZD(16\,bit)}{16384} \cdot Normalization\ \ factor$ |
| N4 | 32 bit | -2147483648 ... 2147483647 | $\frac{PZD(32\,bit)}{1073741824} \cdot Normalization\ \ factor$ |

*Table 4-2 Normalization for internal closed-loop control quantities*

| Quantity | Reference quantity | Parameter |
|---|---|---|
| Material velocity | *V_reference* | H104 |
| Knife velocity | *V_reference* / cos( ε ) | |
| Velocity, knife drive | *Reference speed 1* = Speed at material velocity *V_reference* | d119 |
| Knife position | *Fsymech* | H105 |
| Reference position (material) | *Xref_normalization* | d114 |

## 4.2 Setpoints and actual values

*Table 4-3 Setpoints for the standard software package (from the automation)*

| Setpoint | Significance | Units | Permissible range |
|---|---|---|---|
| *Cutting length* | Format to be cut | 1 mm | 0 ... 32767 mm |
| *Overspeed factor* | Percentage velocity increase when cutting;<br>Practical range: 0 ... 100 ⇒ 0 .. 10% | 0.1 % | 0 ... 10.0 % |
| *Distance to the cut* | Supplementary value for the distance between the light barrier signal and the center axis of the knife, if the cut doesn't directly coincide with the optical barrier mark<br>Sum of the *distance light barrier - knife* + *distance* | 1 mm | 0 ... 32767 mm |

| Setpoint | Significance | Units | Permissible range |
|---|---|---|---|
| | *to the cut*, which is effective | | |
| *Number. of cuts* | Number of cuts for the cut program | 1 | 2 .. 16384 |
| *Cutting force* | The cutting force is switched-in in a defined angular range during the cut | 1 N | 16384 N |
| *Master velocity* | Material velocity for operating situations where there is no material at the measuring wheel | 1 mm/s | 32.767 m/s = 1966.02 m/min |
| *Acceleration* | | 0.1 mm/s² | |
| *Control word 1* | Control word 1 for the drive converter, refer to Table 3-16 | | |
| *Control word 2* | Control word 2 for the drive converter, refer to Table 3-23 | | |
| *Shears control words* | Inputs for the open-loop control of the closed-loop cut to length, refer to Table 3-15 and Table 3-16 | | |

*Table 4-4 Actual values of the standard software package (for the automation)*

| Setpoint | Significance | Units | Range |
|---|---|---|---|
| *Material velocity* | Measured value for the material velocity | 1 mm/s | ... 32,767 m/s = 1966,02 m/min |
| *Knife speed* | Knife speed referred to the reference speed | Reference speed / 16384 | -32768 ..32767 |
| *Current actual value* | Current actual value referred to the reference current | Reference current / 16384 | -32768 ..32767 |
| *Torque actual value* | Speed controller output in the drive converter | Reference torque / 16384 | -32768 ..32767 |
| *Status word 1* | refer to Table 3-17 | | |
| *Status word 2* | refer to Table 3-18 | | |
| *Shears status* | refer to Table 4-8 | | |

## 4.2.1 Control words

The standard software package uses 4 control words:

- *Control word 1* and *control word 2* for the CU (refer to Table 3-16, Table 3-23). The structure of *control word 1* is identical with the first PZD, which is received from CB. However, this control word is not completely transferred from the CB to the CU. The enable signals (setpoint, ramp-function generator, …) are generated from the closed-loop cut to length.
- 2 shears control words (data inputs for the closed-loop cut to lengths)

*Table 4-5 Shears control word 1 (chart 270)*

| Bit | Name | Control bit | Function for '1' |
|---|---|---|---|
| 0 | SCTW1.0 | Not defined | |
| 1 | SCTW1.1 | Continuous cut | Continuous cut requested |
| 2 | SCTW1.2 | Test cut | Test cut requested |
| 3 | SCTW1.3 | Single cut | Single cut requested |
| 4 | SCTW1.4 | Length setpoint valid | Requested length setpoint is valid |
| 5 | SCTW1.5 | Light barrier, start of the material web | Light barrier identifies the material |
| 6 | SCTW1.6 | Referencing | Request knife calibration |
| 7 | SCTW1.7 | Not defined | |
| 8 | SCTW1.8 | Approach start position | Request, approach start position |
| 9 | SCTW1.9 | | |
| 10 | SCTW1.10 | Enable cut program | Cut program is enabled;<br>the length setpoint is transferred with the '0'⇒'1' edge |
| 11 | SCTW1.11 | Crop cut enable | At the start of the material web, the first cut is with the crop length<br>Special format, (refer to Chart 60) |
| 12 | SCTW1.12 | End cut | Request end cut |
| 13 | SCTW1.13 | Not defined | |
| 14 | SCTW1.14 | Approach knife change position | Request that the knife moves into the knife change position |
| 15 | SCTW1.15 | Option, special test | After the cut program has been completed, a sheet is cut with a special length |

*Table 4-6 Shears control word 2 (Chart 280)*

| Bit | Name | Control bit | Function for '1' |
|---|---|---|---|
| 0 | SCTW2.0 | Not defined | |
| 1 | SCTW2.1 | External fault / alarm 1 | Error/alarm 1 active |
| 2 | SCTW2.2 | External fault / alarm 2 | Error/alarm 2 active |
| 3 | SCTW2.3 | Jogging 1 | Request jogging 1 |
| 4 | SCTW2.4 | Jogging 2 | Request jogging 2 |
| 5 | SCTW2.5 | Not defined | |
| 6 | SCTW2.6 | Not defined | |
| 7 | SCTW2.7 | Fast stop | Request no fast stop |
| 8 | SCTW2.8 | Not defined | |
| 9 | SCTW2.9 | Coarse reference | Knife at the coarse reference mark |
| 10 | SCTW2.10 | Not defined | |
| 11 | SCTW2.11 | Not defined | |
| 12 | SCTW2.12 | Enable cutting operation | Prerequisite for all cutting operating modes |
| 13 | SCTW2.13 | Not defined | |
| 14 | SCTW2.14 | Not defined | |
| 15 | SCTW2.15 | Acknowledge fault | Acknowledge faults |

## 4.2.2 Status words

*Table 4-7 Open-loop control status (Chart 510)*

| Bit | Assignment | Function for '1' |
|---|---|---|
| 0 | Load TR encoder | The absolute position is requested from the TR encoder (see 4.4.3) |
| 1 | '0' | |
| 2 | Position controller enable | Position controller is enabled |
| 3 | At the start position | Knife is located at the start position |
| 4 | Fast stop from the CU | The basic drive does **not** signal a fast stop |
| 5 | Knife stationary | Knife drive stationary |
| 6 | Drive converter ready | All of the prerequisites have been fulfilled for drive converter readiness (Chart 360) |
| 7 | TR start fault | The load output of the TR encoder does not respond to the load request |
| 8 | TR no load frequency | No position track pulses during the load operation for TR encoder |
| 9 | TR load time | Maximum load time of the TR encoder exceeded |
| 10 | Setpoint enable | Open-loop cut to length enables the setpoints for the drive converter |
| 11 | Knife calibrated | Knife position is calibrated |
| 12 | Fault | Fault effective |
| 13 | Open brake | The open-loop brake control releases the brake |
| 14 | n_knife > 0 | Knife standstill identification signals "knife is **not** stationary" |
| 15 | Inverter enabled | Power-off delayed drive converter operating signal to control a motor fan (also refer to H998) |

*Table 4-8 Status of the shears (Chart 520)*

| Bit | Source | Assignment |
|---|---|---|
| 0 | Perm. assigned | Knife is calibrated |
| 1 | Perm. assigned | Knife in the cutting range (the knife is in synchronism with the material) |
| 2 | Perm. assigned | Knife in the format range (knife is outside the cutting range) |
| 3 | Perm. assigned | Knife at the start position |
| 4 | Perm. assigned | Knife at the change position |
| 5 | Perm. assigned | Cut program completed |
| 6 | Perm. assigned | Zero pulse, knife (extended to 100 ms) |
| 7 | H547 | Mode positioning |
| 8 | H548 | Raise knife |
| 9 | H549 | Lower knife |
| 10 | H550 | Knife at the top position |
| 11 | H551 | Knife at the bottom position |
| 12 | H552 | Synchronization pulse reference (even if synchronizing disabled) |
| 13 | H553 | Light barrier |
| 14 | H554 | '0' |
| 15 | H555 | '0' |

## 4.3 Mode of operation

All of the applications considered, involve synchronizing the motion of a cutting device to a moving material web, whereby the cut must be made at a precisely defined position on this material web. The cutting operation lasts as long as the material and knife are in contact with one another

During this time, the cutting device must generally move in precise synchronism with the material web. There are also applications, where the knife moves faster than the material by a specific factor (overspeed factor), which then pushes the cut sheet forwards. It may also be necessary, due to the knife geometry, to adapt the velocity to a position-dependent characteristic during the cut, in order to keep the knife parts precisely at the material velocity.

After the cutting operation, the knife is brought back into the initial position.

There are significant differences between the motion of rotating and linear knife systems. Thus, these systems will be separately handled.

## 4.4 Plant geometry and motion sequences

The machine geometry is defined using parameters. Their significance differs as to whether it involves a rotating- or a linear system.

### 4.4.1 Systems with rotary axis

**Plant geometry**

Systems which use rotary axes, are characterized by the fact that the drive for the knife position always rotates in one direction of rotation. The knife position actual value is reset to 0 at the center of the cutting range.

For rotating systems, angular constants can be specified in degrees (normalization H100 = 360.0; exception, refer to the "double saw" example. The 0° mark $\alpha_R$ lies at the center of the cutting range. When $\alpha_R$ is exceeded, the knife position is set to 0 using the zero pulse of the knife encoder. Thus, contrary to linear systems, there is an angular overflow (refer to Fig. Fig. 4-3 ).

For AX, the knife is no longer in contact with the material; at AY it again comes into contact with the material. Refer to Fig. 4-1 and Table 4-9 for additional definitions.

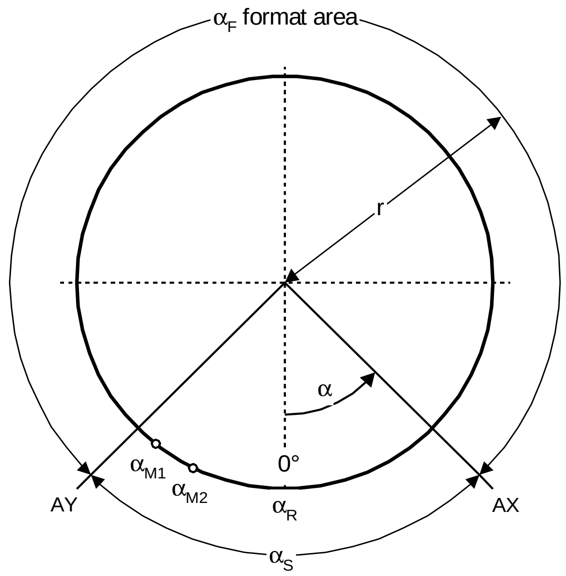



*Fig. 4-1 Angular definition for rotating cutting devices (drum-type shears)*

*Table 4-9 Angular definitions for rotating shears*

| Qty. | Parameter | Significance |
|---|---|---|
| AX | H101 | Angle: End of the cutting range; the knife is no longer in contact with the material |
| AY | H102 | Angle: The knife enters the cutting range |
| AZ | H103 | Percentage position of the transition point in the motion sequence (this is not an angle!) |
| $\alpha_F$ | | Format range (the knife velocity is not the same as the material velocity) |
| $\alpha_S$ | | Synchronous range or cutting range (knife velocity = material velocity) |
| $\alpha_{M1}$ | | Start of the cutting torque input |
| $\alpha_{M2}$ | | End of the cutting torque input |
| $\alpha_R$ | | Reference point position |
| r | | Radius through which the knife moves |

**Significance of the mechanical synchronous format Fsymech**

If the knife rotates with a constant speed, whereby the circumferential velocity of the knife ($\omega \cdot r$) is the same as the material velocity, then sheets are cut with length $2\pi r$. This size (quantity) is known as the *Fsymech* mechanical synchronous format in the following text. The associated speed is the *synchronous speed*.

If shorter material formats are to be cut, the knife must be accelerated as soon as it has exited the cutting range. This means, that the knife can re-enter the cutting range faster than at the synchronous speed. The following diagram is obtained when showing the knife speed as a function of time with respect to the material position.

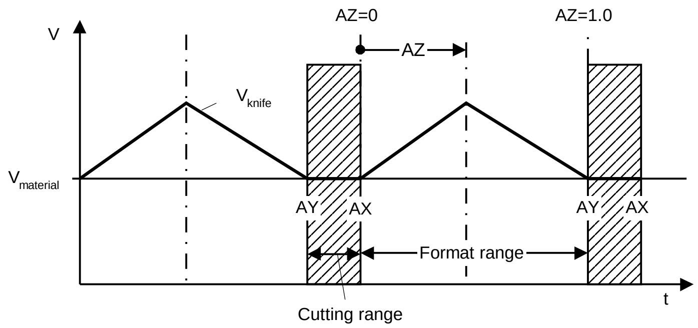



*Fig. 4-2 Circumferential velocity of the knife for the format < Fsymech (principle)*

At a constant material velocity, time and material position are proportional to one another. Then the "period" of the knife velocity corresponds to the cut sheet length. Further, the integral over the knife velocity must correspond, during one period, to precisely 360°, as the knife rotates through precisely one revolution during this time.

If sheet formats are to be cut, which are longer than *Fsymech*, then the knife must be braked when it exits the cutting range. From a specific format length onwards, the knife even brakes down to standstill. This format is called the *limiting format*. For all format lengths which exceed the *limiting format*, the knife remains in a wait position, until the material has been transported forwards by an adequate length.

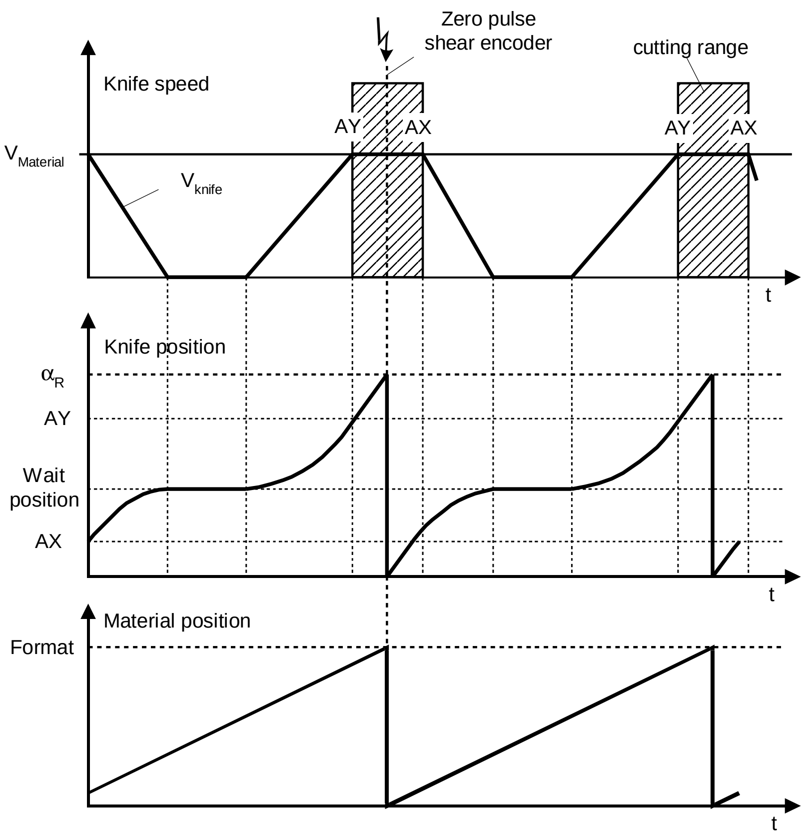



*Fig. 4-3 Circumferential velocity and knife position for format >> Fsymech (principle)*

The symmetry of the characteristics is specified by the quantity AZ (refer to Fig. 4-2). For AZ = 0.5 the transition point lies between AX and AY. In this particular case, the velocity characteristic is symmetrical to AZ. As AZ decreases, the transition point shifts increasingly towards the AX direction. At AZ=0, the transition point coincides with AX. Theoretically, the knife velocity must make a step function.

Thus, the torque stressing of the drive motor can be influenced using AZ. Symmetrical characteristics result in lower torque stressing; non-symmetrical characteristics can be used for lower torques when entering the cutting range, which allows the cutting accuracy to be influenced.

### 4.4.2 Systems with linear knife motion

The motion sequence for linear knife systems is sub-divided into the following sections:

1. Synchronization
2. Synchronous range (with cut)
3. Braking
4. Return to the initial position (start position) by reversing the drive direction of rotation for the knife position

From starting from the quiescent position up to the end of the synchronous range, the characteristics of the linear and rotating systems coincide. Thus, both system versions can be realized using the same software.

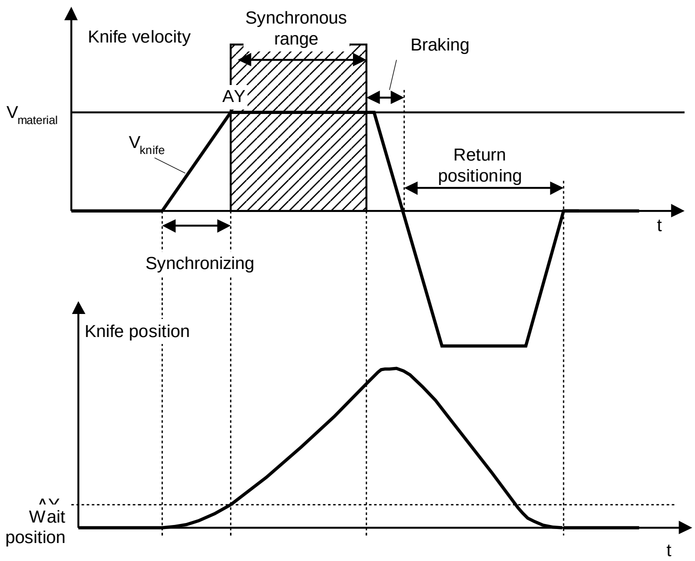



*Fig. 4-4 Knife speed and position in the linear system*

The following definition is obtained from the analogy to the rotating system:

**Significance of Fsymech**

Fsymech = maximum acceleration travel in [mm]

Fsymech is also used to normalize the system for the knife coordinates (H100). This allows knife coordinates (e.g. and AX and AY) to be entered in [mm], displayed and evaluated (e.g. for knife-position dependent functions).

The velocity diagram in Fig. 4-3 must be parameterized as follows by defining the angular constants:

- AX = 0
- AZ = 0 (shifting the wait position to 0)
- AY = 0 ... Fsymech (defines the accelerating range)

### 4.4.3 Absolute knife position

**Applications with rotary axes**

In order to be able to sense the absolute encoder position, an encoder must be used with a reference point on the gearbox output side. For practical reasons, the encoder zero pulse is used. The reference point position must be able to be freely selected so that it can be located in the cutting range of the knife.

Optionally, an additional proximity switch (BERO) can be mounted. It must be adjusted so that this course reference is active in the quiescent setting range of the knife, i.e. when the knife is fully opened. In this case, the system can be referenced using jogging 1, without having to pass-through the cutting range.

**Applications with linear axes**

For linear systems, the reference position is located in the quiescent setting of the knife, i.e. outside the cutting range and close to the limit switch. The zero mark is defined using a proximity switch or by combining a proximity switch (coarse pulse) with the zero pulse of the knife feed.

**Applications with absolute value encoders**

Three types of absolute value encoders are used to sense the knife position:

- TR encoder (pulse encoder, which sense the absolute position, and output, when requested, this as pulse sequence at the incremental tracks).
- Absolute value encoder at the T400 terminals (SSI- or EnDat encoder)
- Absolute value encoder connected to an encoder sensing module of the basic drive (CU), whereby the absolute position must be transferred as process data from the CU to the T400.

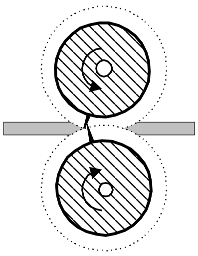
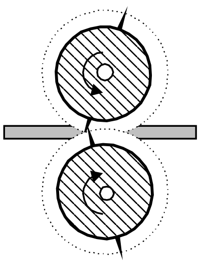
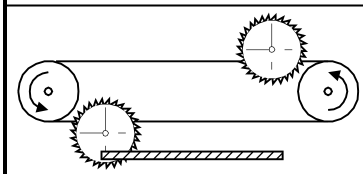
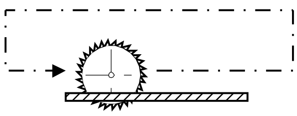
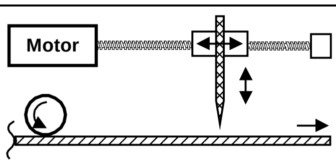
When using an absolute value encoder, the incremental position sensing is initialized with the absolute knife position.

## 4.4.4 Typical system configurations

The following overview shows the essential system configuration parameters using typical systems.

Both for systems with rotary- as well as linear axis, there are applications where the knife- and material movement directions deviate from one another. In these cases, the speed- and position components are required in the material flow direction, which can be calculated using the *Epsilon* parameter(H108).

*Table 4-10 System overview*

| Schematic | Description | Fsymech | Feed/revolution. |
|---|---|---|---|
|  | **Drum-type shears**<br>1 knife at the circumference of the shears-type drum<br>Rotary axis with normalization in angular degrees (H100 = 360) | Radius of action of the knife | Fsymech |
|  | **Drum-type shears** with 2 knifes along the circumference<br>Rotary axis with normalization in angular degrees (H100 = 360) | Half the radius of action | Radius action =<br>2 · Fsymech |
|  | **Double saw**<br>Rotary axis with normalization mm (H100 = Fsymech). Reference position at the cut center | Half the length of the transport belt | Circumference of the drive wheel of the transport belt |
|  | **Flying saw**<br>Linear axis. Knife position in mm with respect to the wait position | Acceleration range: Distance between the wait position and the start cut | Knife travel for 1 revolution of the knife feed drive |
|   | **Flying knife**<br>Linear axis. Knife position in mm with respect to the wait position | Acceleration range: Distance between the wait position and the start cut | Spindle feed per revolution |

## 4.5 Closed-loop control structure

The closed-loop control essentially comprises the following components

- Setpoint generator for synchronization operation (*format generator*)
- Setpoint generator for return positioning (*PosRG*; this is not required for rotating shears)
- Closed-loop control section

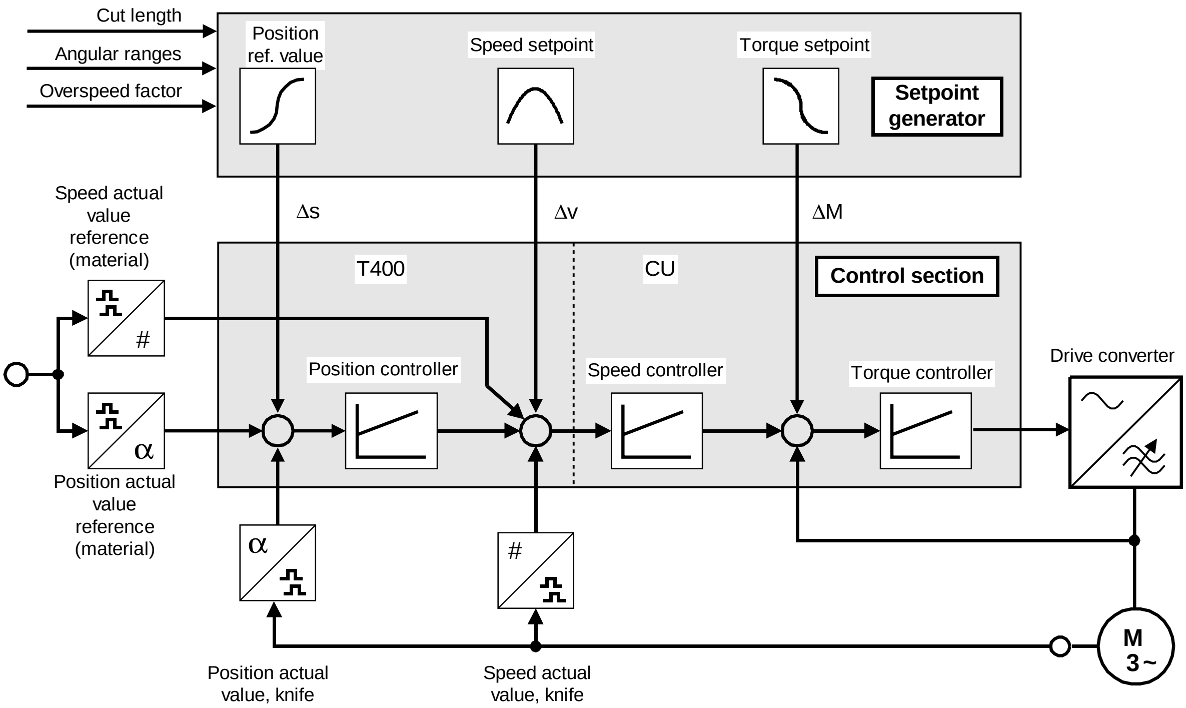



*Fig. 4-5 Closed-loop control structure*

The setpoint generator calculates the setpoints for the knife position, -speed and the required torque from the cutting data (refer to Fig. 4-5). The position controller is computed on the T400; the speed- and torque controllers in the drive converter.

The setpoint generator requires the following input quantities:

- Plant/system geometry (AX, AY)
- Required speed characteristic (select the characteristic type)
- Cut format
- Reference velocity (material)
- Reference position
- Overvelocity factor

## 4.5.1 Types of characteristics

The characteristic of the knife speed is defined by selecting the type of the characteristic (parameter H154) and the position of the transition point AZ (refer to Fig. 4-2). The types of characteristics which are available are shown in the following table.

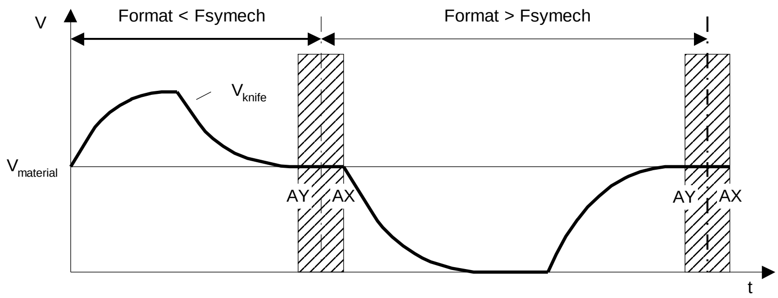
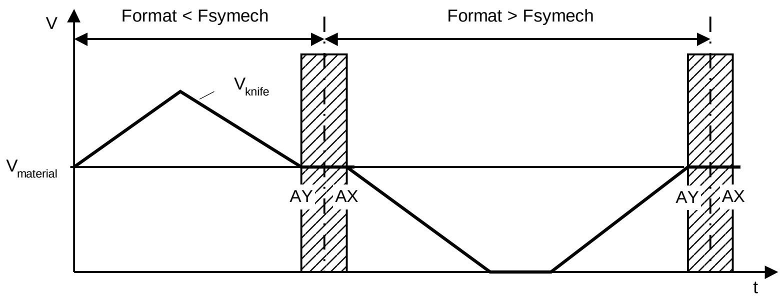
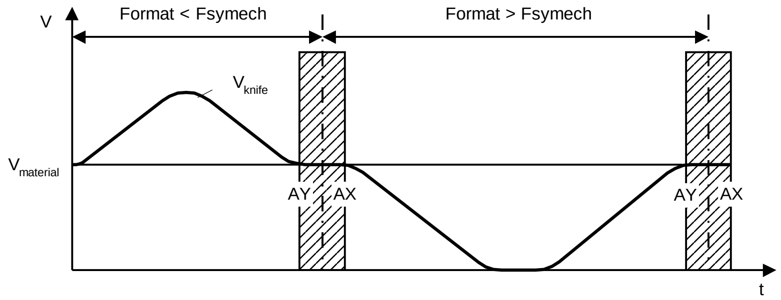
| Type of characteristic<br>H154 | Characteristics |
|---|---|
| 0<br>Sinusoidal arc |  |
| 1<br>Linear ramps |  |
| 2<br>Linear ramps with rounding-off<br>(start and end, each with 10% of the V amplitude) |  |

*Fig. 4-6 Types of characteristics for the format generator*

The type of characteristic is selected depending on the particular application. The smoother the transition of the velocity from acceleration into the cutting range, then the more precise is the cut. On the other hand, linear ramps (type 1) allow the best possible utilization of the motor torque.

## 4.6 Systems with rotary axis

The sub-functions of the closed-loop cut to length will be described using examples of plants and systems. These will explain the basic settings of the closed-loop control. Detailed functions will then be described using case studies. The solutions of detailed functions (e.g. pass mark synchronization) are principally valid for other system types as well (also using linear axes).

### 4.6.1 Drum-type shears (basic settings)

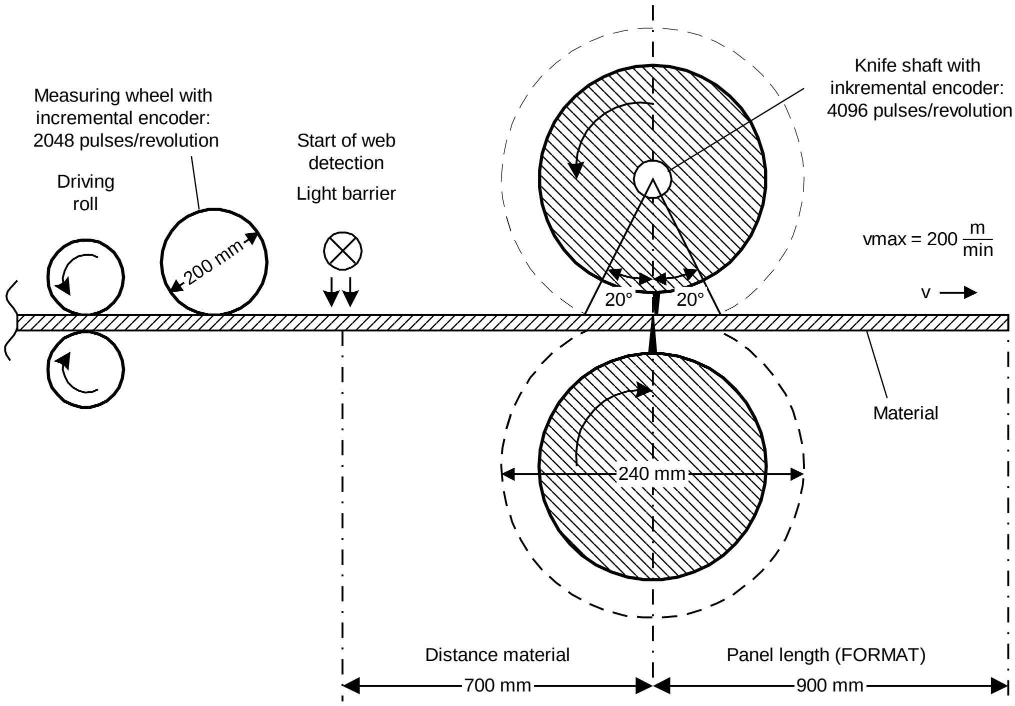



*Fig. 4-7 Drum-type shears (typical system)*

*Table 4-11 System-specific data*

| Param | Value | Quantity | Significance |
|---|---|---|---|
| H100 | 360 | *X_Shear Norm* | Normalization value for knife coordinates (AX, AY are specified in degrees) |
| H101 | 20 | *AX* | Exit angle |
| H102 | 340 | *AY* | Entry angle (refer to Fig. 4-1) |
| H104 | 200 $^{m}/_{min}$ | *Reference Speed* | *Reference Speed* is the maximum material velocity |
| H105 | 753.98 mm | *Fsymech* | Circumference of the circle of knife blade movement |
| H108 | 0.0° | *Epsilon* | Knife and material have the same direction of motion |
| H115 | 628.319 mm | *SizeMeas.Wheel* | Measuring wheel circumference |
| H117 | 753.98 mm | *Feed/Revolution* | Knife travel for 1 revolution of the knife axis |
| H120 | 0 | *Mode linear axis* | Rotary axis (knife position is reset for cut at 0) |
| H122 | 700 mm | *Distance_material* | Distance between the light barrier for start of web detection and center of the knife |

The drive motor for the knife is directly mounted on the knife without a gearbox. The knife and motor can therefore use the same incremental encoder. This is electrically connected to the CU. The position tracks and the zero pulse are transferred from the encoder emulation (pulse encoder module of the CU) to the T400 via the backplane bus.

**Error correction, reference position**

The knife position when cutting is a function of the reference position. Thus, all of the errors when sensing the reference position flow directly into the cutting accuracy. Although the precise reference position is forced by the cut, and is therefore known, this operation is used to set the reference position.

The zero pulse from the knife encoder is simultaneously used as zero pulse for encoder 2. When cutting, the knife position and the reference position are set to zero (refer to Fig. 4-1) and therefore all of the reference position sensing errors which have occurred, are deleted.

*Table 4-12 Hardware connections (terminals, refer to Fig.* Fig. 3-1*)*

| Signal | Module | Source |
|---|---|---|
| Encoder connections of the CU | CU | Incremental encoder at the knife |
| Tracks A, B, encoder 1 | T400 | Via the backplane bus from CU |
| Zero track, encoder 1 | T400 | Via the backplane bus from CU |
| Tracks A, B, encoder 2 | T400 | Incremental encoder, measuring wheel |
| Zero pulse, encoder 2 | T400 | Zero pulse, encoder emulation of the CU (encoder 1 and encoder 2 using the same zero pulse) |
| Terminal 65 | T400 | Light barrier signal to identify the start of the material web |

*Table 4-13 Incremental encoder settings*

| Param | Value | Quantity | Significance |
|---|---|---|---|
| H400 | 4096 | Pulses Encoder 1 | Pulses/revolution of the incremental encoder at the knife |
| H420 | 2048 | Pulses Encoder 2 | Pulses/revolution of the incremental encoder of the measuring wheel |

### 4.6.1.1 Pass mark synchronization

To synchronize to a mark on the material requires a light barrier to sense it (H106). When the mark is passed, the reference position must precisely have the following value

$X_{SET}$ *= reference position(pass mark) = sheet length - distance(cut - pass mark)*

This guarantees that the cut is precisely made at the pass mark (the cuts can be made at a defined distance from the pass mark using H107 *distance to the cut*).

This distance between the cut (knife center position) and the next pass mark is also dependent on the actual sheet length, as shown in the following table and Fig. 4-8.

*Table 4-14 Setting value for the reference position (material position) for the pass mark synchronization (refer to Fig. 4-8 )*

| Operating case | Identification | Distance, pass mark to the cut $X_{PM}$ | Setting value $X_{SET}$ |
|---|---|---|---|
| Light barrier senses the next cut position. | FORMAT >= $X_{LG}$ | $X_{LG}$ | FORMAT - $X_{LG}$ |
| Several pass marks are located between the light barriers and knife (also applies for the operating case above) | FORMAT < $X_{LG}$ | $X_{LG}$ modulo FORMAT | FORMAT - $X_{PM}$ |
| Light barrier placed behind th cut region | FORMAT > $X_{LG}$ | $X_{LG}$ | $X_{LG}$ |

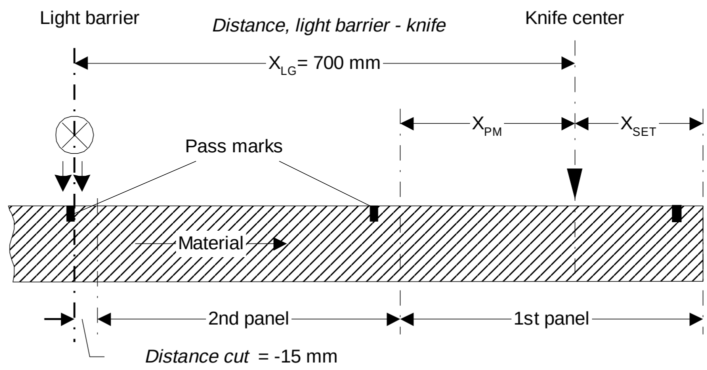



*Fig. 4-8 Defining the reference position setting value $X_{SET}$*

**Cutting instant**

The reference position is set to the setting value $X_{SET}$ when the pass mark is passed. Thus, the "set position" function is no longer available when cutting. Instead of this, the reference position is corrected by the sheet length when cutting:

*Reference position(cut) = reference position - sheet length*

*Table 4-15 Parameters for pass mark synchronization and values for the example above*

| Param | Chart | Value | Quantity | Significance |
|---|---|---|---|---|
| H095 | 60 | 3106 | *S.Dist.LightGate* | Source for the distance from the light barrier to the knife center axis ⇒ fixed value |
| H096 | 60 | 3107 | *S.Dist. Cut* | Source for the distance between the pass mark and cut ⇒ fixed value |
| H106 | 60 | 700 mm | *Dist. Light Gate* | Distance from the light barrier to the knife center axis. |
| H107 | 60 | -15.0 mm | *Dist. Cut* | Fixed value *distance to the cut.* The cut is made 15 mm in front of the pass mark (example) |
| H424 | 130 | 0413 | *S.Pos_2 correct* | Source for the pulse, generated per software to correct the reference position when cutting. The reference position is reduced by the current format length.<br>Possible sources: ‘0413’ or ‘0417’ |
| H427 | 130 | 3630 | *S.Pos.corr.Val2* | Correction value of the reference position when cutting. This corresponds to the currently effective format length. |
| L202 | 180 | 3094 | *S.SV_Setvalue* | Source for the setting value of the reference position according to $X_{SET}$ (refer to Fig. above) |

### 4.6.1.2 Suppressing pass marks

For the case where there are several pass marks within a sheet, from which only one is relevant for the particular cut, there are two selection techniques. One involves counting the marks and enabling synchronization from a counter status which can be specified (refer to Chart 135).

The other technique is to issue a position-dependent enable signal using free blocks. As a result of the dimension data, specified in Fig. 4-8, the material position is uniquely defined, when the pass mark passes the light barrier (setting value, pass mark; KR3094 in Chart 180, 7). If the material is located within a tolerance window around the position value, then synchronization can be enabled via the pass mark. Synchronizing is inhibited in the remaining sheet range.

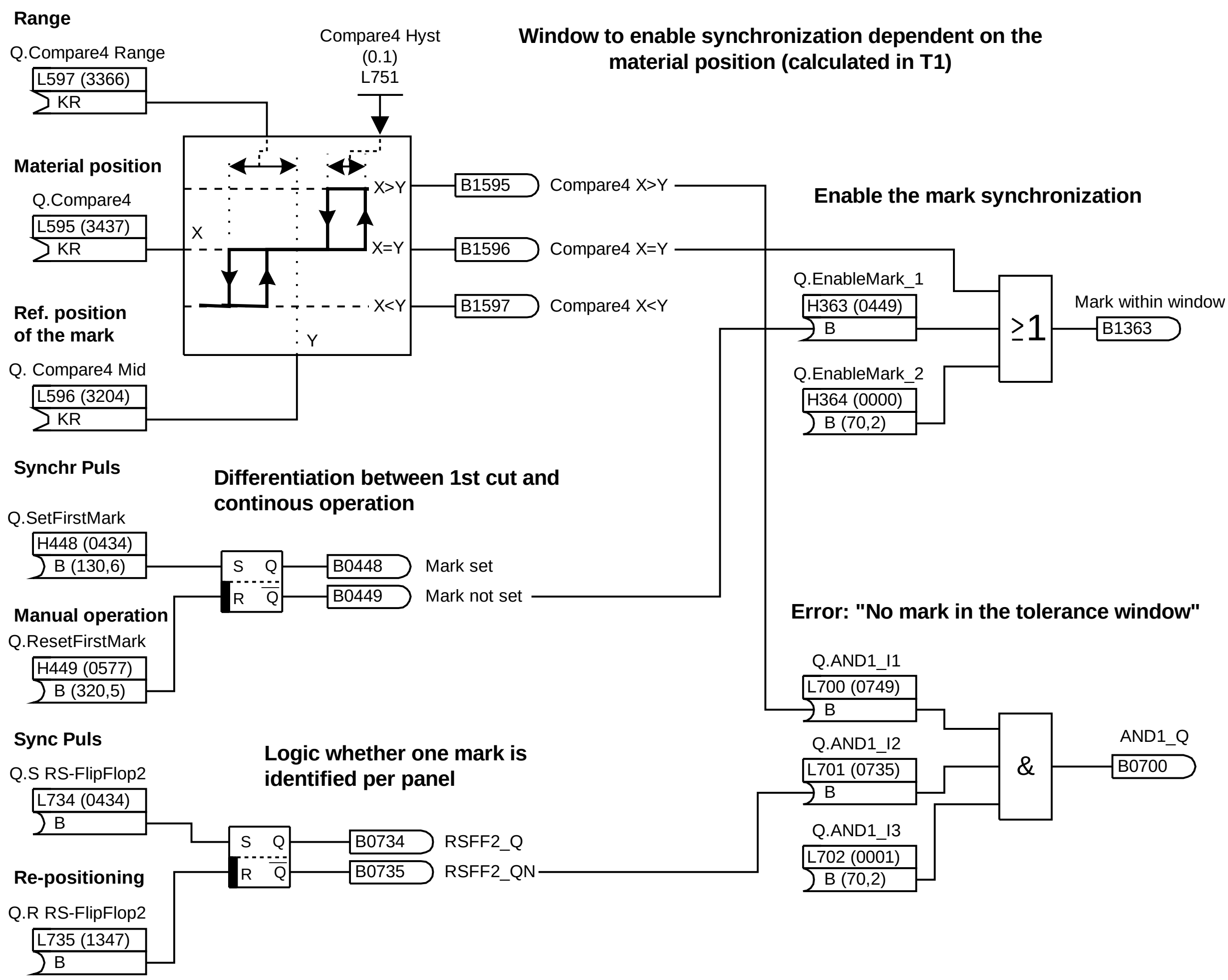



*Fig. 4-9 Enabling the pass mark synchronization as a function of the material position (example for using free blocks; in this case, for a linear system)*

### 4.6.1.3 Offset correction

When setting the reference position, the closed-loop control mustn't be influenced by step functions. The value for the closed-loop control (Y in Fig. 4-10) must be adapted, in small steps (H444 correction increment) to the corrected measured value YP when setting. The *offset correction* function is used to realize this (Chart 135).

The offset correction can also be effective for extremely large offset values (e.g. for the first offset correction) over several cutting operations. A new correction operation is not started until a correction operation has been completed.

While the knife moves in the cutting range, the offset correction can be held. Thus, the time derivatives of the reference position P and the corrected position Y are identical, i.e. the knife and material are moving at the same velocity. This avoids the knife being subject to various forces.

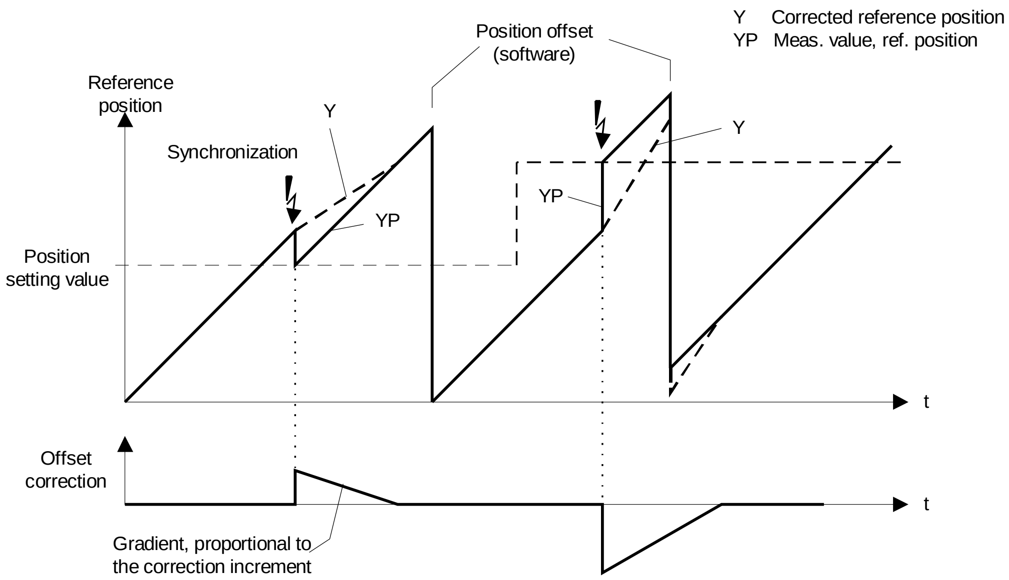



*Fig. 4-10 Examples for offset corrections*

*Table 4-16 Parameters for offset correction*

| Para. | Chart | Value | Quantity | Significance |
|---|---|---|---|---|
| H431 | 135 | 3094 | *S.Ref_Mark_Pos* | Source for the reference position when the pass mark is reached (the same setting as for L202 S.*SV_setting value*) |
| H432 | 135 | 0453 | *S.FreezeCorrect.* | Source to hold (interrupt) the offset correction. Combined with the *shears in the cutting range* signal. The correction is continued outside the cutting range. |
| H444 | 135 | 0.1 % | *Correct. increm.* | For each operation, the offset correction is reduced by the *correction increment* (with the exception when correction is held). In the example: an offset of *Fsymech* is corrected in 1000 · T1. |

#### 4.6.1.4 Offset synchronization of the knife position

The position encoder for the knife position should be adjusted so that a synchronizing pulse is generated, if the knife is in the setting $\alpha_R$ (Fig. 4-1). The position sensing (Chart 120) then generates a cutting pulse.

For situations, where this adjustment is not possible, a cutting pulse can be simulated. The cutting pulse is available at connector B0417:

- The position setting value for synchronization is set to the synchronizing pulse angle. This is only effective once for the position actual value (when referencing).
- A maximum encoder pulse number is specified (H409). A position maximum (H400) is calculated from the encoder pulse number ( H409 / (4 · H400) ).
- As soon as the position maximum has been exceeded, the position is reduced by the position maximum, and a *position maximum exceeded* pulse generated. This pulse is used as cutting.

*Table 4-17 Parameters to simulate the cutting pulse; new connection to the new cutting pulse source (example)*

| Para. | Chart | Quantity | Value | Significance in this application |
|---|---|---|---|---|
| H173 | 200 | S.FormatChanged1 | 0417 | New connection: Enable condition for the format controller to *position maximum exceeded* |
| H188 | 265 | S.Cutc_Int=0 | 0417 | New connection: Control signal for the cutting characteristic processing |
| H400 | 120 | Pulses Encoder1 | 1024 | Pulses/revolution of the knife position sensing |
| H409 | 120 | Max.PulsesEnc_1 | 4096 | Defining the position maximum and activating the automation position correction when the maximum is exceeded to one revolution ( 4096/ (4·1024) = 1.0 )<br>⇒ The knife position is reduced by 1.0 when the position actual value 1.0 is exceeded. |
| H414 | 120 | S.Pos.SyncPuls | 0417 | New connection: Synchronizing pulse extension |
| L312 | 170 | CoarseRef pos. | 0.5 | Position setting value for the knife position = position of the synchronizing pulse (normalization is not in degrees!). In the example: offset by 180° (0.5 · 360°) |

### 4.6.2 Double saw

The arrangement in Fig. 4-11 is an example for a system with rotary axis, where the knife coordinates are specified in [mm] instead of angles to make is clearer.

This system has 2 saws. While the first cuts through the material, the second is brought into the wait position. The knife position is the position of the transport chain. For each cut, the knife position therefore changes by half of the chain length.

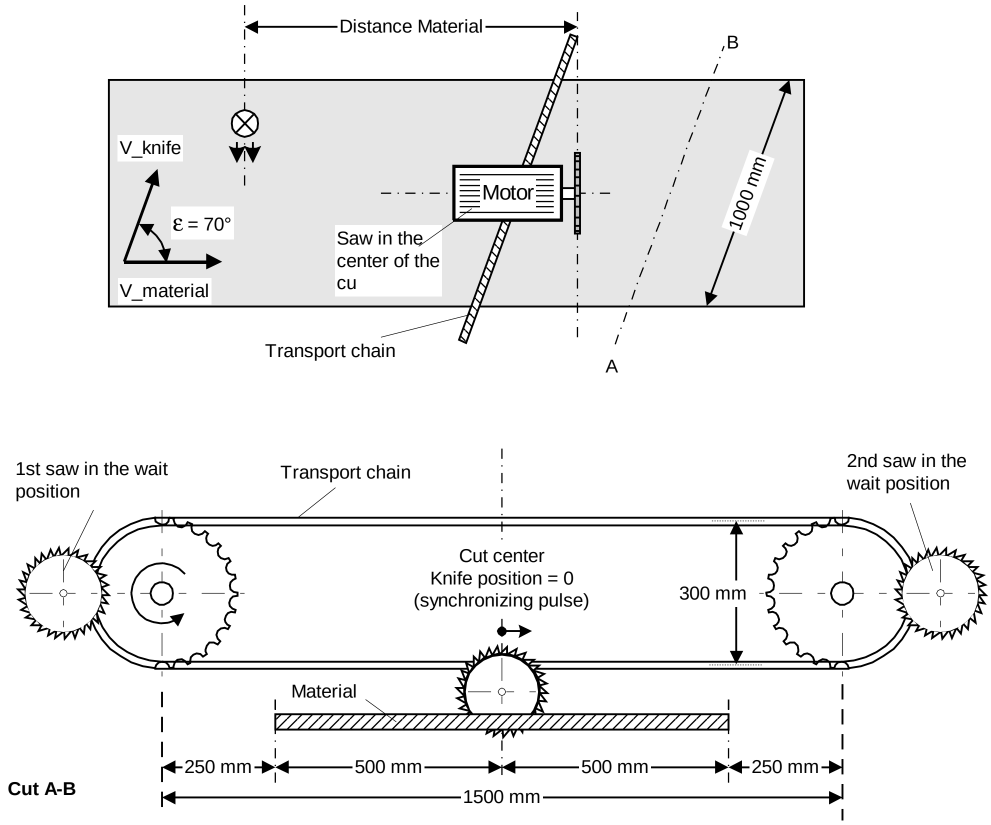



*Fig. 4-11 "Double saw" system schematic*

The system is in the synchronous mode, if the transport chain runs with a constant velocity. In this case, the following is valid:

Material velocity = knife velocity · cos(ε)

A gearbox with a ratio of 10:1 is located between the motor and chain wheel. The knife position is sensed using the motor encoder. The position is synchronized using a proximity switch, and more precisely, each time that a saw reaches the center of the cutting range. This setting is also decisive for the distance between the saw blade and a light barrier is used to sense the material web.

*Table 4-18 Plant-specific data for the double-saw arrangement*

| Param | Value | Quantity | Significance |
|---|---|---|---|
| H100 | 1971.239 mm | *X_Shear Norm* | Normalization value for the knife coordinates corresponds to Fsymech (AX, AY are specified in mm) |
| H101 | 500 mm + $R_{saw}$ | *AX* | Exit position: The saw blade exits the cutting range, after 500 mm + radius of the saw blade ($R_{saw}$) |
| H102 | 1971.239 mm - AX | *AY* | Entry position in the cutting range, taking into account the saw blade diameter |
| H104 | 20 $^{m}/_{min}$ | *Reference Speed* | Maximum material velocity |
| H105 | 1971.239 mm | *Fsymech* | Knife travel per cut |
| H108 | 70.0° | *Epsilon* | Angle between the knife- and the material movement direction |
| H117 | 942.478 mm | *Feed/Revolution* | Knife travel for one revolution of the toothed wheel |
| H120 | 0 | *Mode LinearAxis* | Rotary axis (knife position is reset to 0 when cutting) |

# 4.7 Linear systems

For linear systems, the cutting device is synchronized to the material velocity, cuts, and then returns to the initial position. Thus, there is no position overflow. The parameterization of the knife-specific coordination is realized in mm. In this case, H100 is set to Fsymech (*X_Shear Norm*).

## 4.7.1 Flying knife

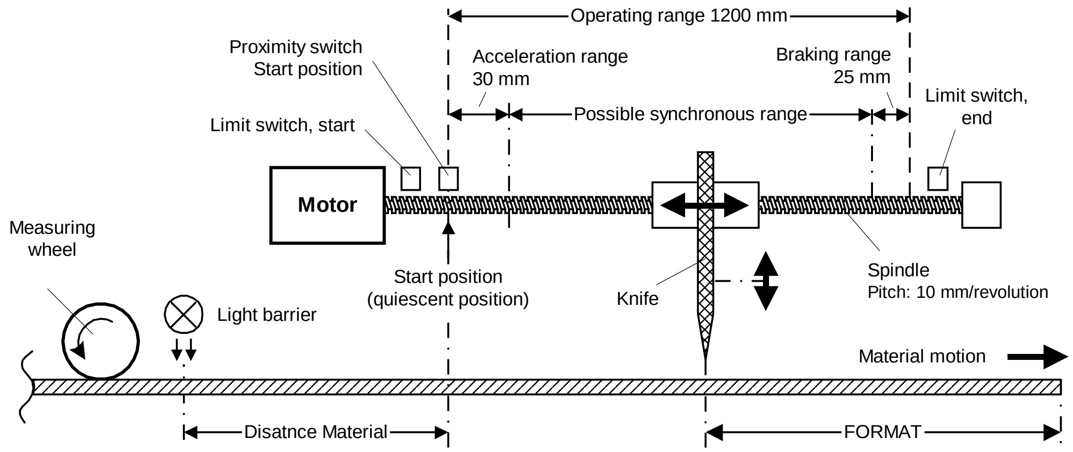



*Fig. 4-12 System principle for the flying knife*

*Table 4-19 System-specific data, "flying knife"*

| Param | Value | Quantity | Significance |
|---|---|---|---|
| H100 | 30.0 mm | *X_Shear Norm* | Maximum knife acceleration travel. This allows AX, AY to be specified in mm (refer to Chart 60). |
| H101 | 0.0 mm | *AX* | The start position is defined as 0 using H101 and H103. |
| H102 | 30.0 mm | *AY* | Position, from which the knife must move in synchronism with the material. In this particular example, the complete acceleration travel is used. |
| H103 | 0.0 | *AZ* | The start position is defined as 0 using H101 and H103. |
| H104 | 20 $^{m}/_{min}$ | *Reference Speed* | Maximum material velocity |
| H105 | 30.0 mm | *Fsymech* | Components of *X_Shear Norm* in the material flow direction (in this case, both values are identical |
| H107 | 0.0° | *Epsilon* | Knife movement and material flow direction are identical |
| H115 | | *SizeMeas.Wheel* | Measuring wheel circumference |
| H117 | 10 mm | *Feed/Revolution* | Spindle pitch. This is used to normalize the knife position and velocity (refer to Chart 80). |
| H120 | 1 | *Mode LinearAxis* | Linear axis (The knife position is not reset to 0 when cutting) |
| H122 | | *Distance material* | Distance between the light barrier and the end of the accelerating range (from here onwards, the knife is located above the cutting position. |
| H197<br>L201 | 3441<br>3168 | *S.SV_Startlength*<br>*S.RefPos Limit* | Shifting the web coordinate system. Thus the distance to light barrier is related to the start position of the knife. |

**Mode of operation**

The knife (or the saw) waits in the starting position until the material has reached the starting length. After this, the knife accelerates. From the end of the acceleration onwards, it moves in synchronism with the material. The knife is now lowered and cuts-through the material. After this, the knife is lifted, and, as soon as it is located above the material, is returned to its starting position. When starting the positioning operation, the actual sheet length is subtracted from the material position (position correction function of the material position; H424, H427).

The time to lower and raise the knife determines, for a specific material velocity, the distance where the material and knife must run in synchronism. The following information is required (digital inputs) for the sequence control:

- knife position at the start of the range (front limit switch)
- knife position at the end of the range (rear limit switch)
- knife position at the start position (knife position = 0)
- knife is at the top
- knife is at the bottom

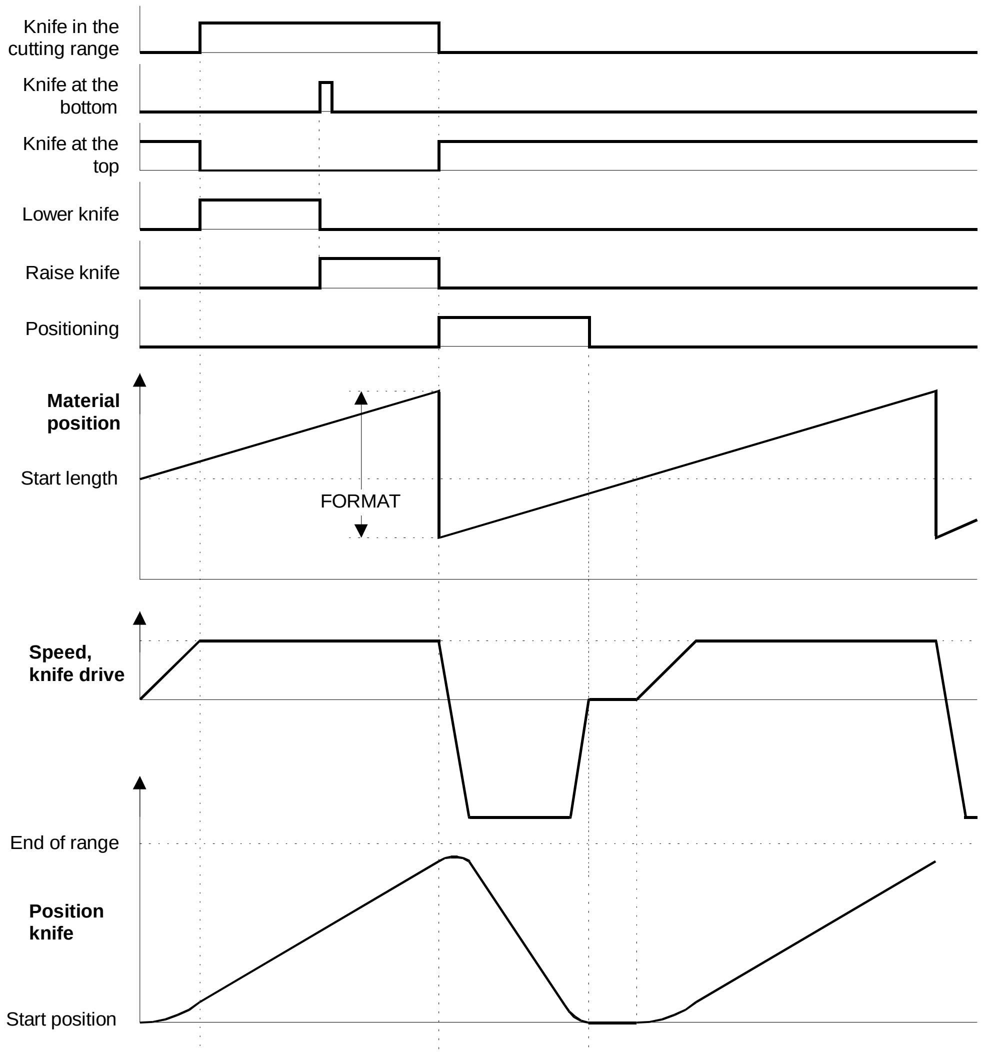



*Fig. 4-13 "Flying knife" timing*

### 4.7.1.1 Sequence control

The sequence control for the "flying knife" includes 3 functions:

1. Raising the knife
2. Lowering the knife
3. Changeover between format and positioning operation

*Table 4-20 Logical equations for the open-loop control functions "flying knife" ( '•' = AND; '∨' = OR )*

| Function / Status | No. | Logical equations (example) |
|---|---|---|
| Start to raise knife | <1><br><2><br><3> | ( no_cutting operation • manual operation_UP )<br>∨ (cutting operation • knife_bottom )<br>∨ (cutting operation • knife_outside_the_ lowering range) |
| Stop, raise knife<br>(dominant) | <4><br><5> | Knife_top ∨ no_enable<br>v (no_cutting operation • no_manual operation_UP) |
| Start, lower knife | <6><br><7> | (cutting operation • knife_in the_lowering range • format operation • Material_still_not_cut )<br>v ( no_cutting operation • manual operation_DOWN • no_manual operation_UP ) |
| Stop, lower knife (dominant) | <8><br><9><br><10> | v (no_cutting operation • no_manual operation_DOWN)<br>v (knife_not_in the_lowering range • cutting operation )<br>v no_enable ∨ knife_bottom |
| Start positioning = Stop format operation | <11> | Material_cut • knife_top_pulse • cutting operation • mode_linear axis |
| Start, format operation<br>(dominant) | <12><br><13> | No_enable ∨ shears_in the_start position<br>∨ ( positioning_not_active • positioning operation ) |
| Material_cut | | - the status is set after cutting has been completed<br>- status is reset, if the knife is in the accelerating range |

### 4.7.1.2 Lowering and raising the knife

In this case, the range must be defined, within which the knife should be or may be raised and lowered. The limiting position $X_{Smax}$, from which position, the knife must be started to be raised, is obtained from the time taken to raise the knife at the maximum material velocity in order to come to a standstill before the end of the operating range.

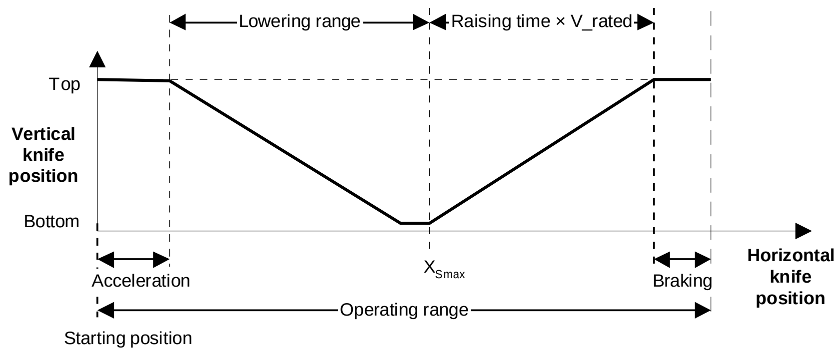



*Fig. 4-14 Ranges to raise and lower the knife*

To monitor the lowering range, the range monitoring in Chart 350 (range 3) is used. This provides the option to shift the limits, as a function of the velocity, whereby this is not used in the particular example.

*Table 4-21 Defining the range, in which the knife may be lowered*

| Param | Value | Quantity | Significance (using the example) |
|---|---|---|---|
| L224 | 675 | *Range3_max* | Upper limit value, where the knife may be in the lower position.<br>Example: max. time to raise the knife = 1.5 s<br>V_reference = 20 m/min<br>⇒ when raising the knife, distance moved = 500 mm<br>*Range3_max = 1200 mm - 500 mm - 25 mm = 675 mm* |

**Comment**

In this particular example, the material is considered to have been cut when the knife has been lowered (operation completed). It would be more correct, so set the "material cut" status, when the knife actually reaches the lower dead point. However, there is the danger that this status would never be reached if, for a high material velocity and mechanical delays, knife lowering would be interrupted before the lower deadpoint is reached.

The conditions for the three control functions can be defined using this range definition:

### 4.7.1.3 Parameterizable STATE logic

The logic functions in the table above should be considered as an application example. For each actual plant or system, changes can be expected to take into account plant or system secondary conditions. In order to be able to create as many different versions as possible, logic functions are not implemented in the form of individual gates, but as parameterizable logic (refer to Chart 400).

A parameterizable *STATE* logic block has 8 BOOLean inputs (I1 ... I8), which can be freely-connected to BOOLean connectors (e.g. to a digital input which signals "knife at the top"). The type of logical combination is defined using mask entries. Each mask selects which inputs or inverted inputs are to be AND'ed.

| Mask bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Associated input | $\overline{I8}$ | $\overline{I7}$ | $\overline{I6}$ | $\overline{I5}$ | $\overline{I4}$ | $\overline{I3}$ | $\overline{I2}$ | $\overline{I1}$ | I8 | I7 | I6 | I5 | I4 | I3 | I2 | I1 |

Example MR1 = 16#8106 = 1000 0001 0000 0110b = $\overline{I8} \cdot \overline{I1} \cdot I3 \cdot I2$

*Fig. 4-15 Assigning the selection mask bits to the inputs*

4 set masks (MS1 ... MS4) and 3 reset masks (MR1 ... MR3) are available. In addition, using the MR mask, the inputs can be selected which cause the internal flipflops to be reset.

*Table 4-22 Input assignment for the "raise knife“ function (Chart 415)*

| Input | Function | Param | Value | The following is used: |
|---|---|---|---|---|
| I1 | No enable | L243 | 0665 | No setpoint enable (Chart 360) |
| I2 | Cutting operation | L244 | 0576 | *Cutting operation active* (Chart 320) |
| I3 | Knife at the top | L245 | 0244 | Digital input 4 used |
| I4 | Knife at the bottom | L246 | 0245 | Digital input 5 used |
| I5 | Knife not in the lowering range | L247 | 0234 | Output of the range monitoring (Chart 350) |
| I7 | Manual operation, UP | L249 | 0000 | Deactivated in the factory setting |
| I8 | Manual operation, DOWN | L250 | 0000 | Deactivated in the factory setting |

The following selection masks are obtained with the input assignment above:

*Table 4-23 Selection masks for the "raise knife" function (refer to Table 4-20)*

| No. | Logical equation | Mask values | Param | Value |
|---|---|---|---|---|
| <2> | I2 • I4 | MS1 = 0000 0000 0000 1010b = 16#000A | L251 | 16#000A |
| <3> | I2 • I5 | MS2 = 0000 0000 0001 0010b = 16#0012 | L252 | 16#0012 |
| <1> | /I2 • I7 | MS3 = 0000 0010 0100 0000b = 16#0240 | L253 | 16#0240 |
| <5> | /I2 • /I7 | MR1 = 0100 0010 0000 0000b = 16#4200 | L255 | 16#4200 |
| <4> | I3 ∨ I1 | MR = 0000 0000 0000 0101b = 16#0005 | L258 | 16#0005 |
| | Unused masks: | MS4 = MR2 = MR3 = 0 | | |

*Table 4-24 Input assignment for the "lower knife" function*

| Input | Function | Param | Value | The following is used: |
|---|---|---|---|---|
| I1 | No enable | L263 | 0665 | No setpoint enable (Chart 360) |
| I2 | Cutting operation | L264 | 0576 | *Cutting operation active* (Chart 320) |
| I3 | Synchronous operation | L265 | 1346 | Mode_synchronous operation (toggling between positioning and format operation; Chart 410) |
| I4 | Knife at the bottom | L266 | 0245 | Digital input 5 used |
| I5 | Knife not in the lowering range | L267 | 0234 | Range monitoring output (Chart 350) |
| I6 | Material still not cut | L268 | 0237 | *RSFF1_QN* (Chart430) |
| I7 | Manual operation, UP | L269 | 0000 | Deactivated in the factory setting |
| I8 | Manual operation, DOWN | L270 | 0000 | Deactivated in the factory setting |

The following selection masks are obtained with the input assignment above:

*Table 4-25 Selection masks for the "lower knife" function (refer to Table 4-20)*

| No. | Logical equation | Mask values | Param | Value |
|---|---|---|---|---|
| <6> | I2 • /I5 • I3 • I6 | MS1 = 0001 0000 0010 0110b = 16#1026 | L271 | 16#1026 |
| <7> | /I2 • I8 • /I7 | MS2 = 0100 0010 1000 0000b = 16#4280 | L272 | 16#4280 |
| <8> | /I2 • /I8 | MR1 = 1000 0010 0000 0000b = 16#8200 | L275 | 16#8200 |
| <9> | I2 • I5 | MR2 = 0000 0000 0001 0010b = 16#0012 | L276 | 16#0012 |
| <10> | I1 ∨ I4 | MR = 0000 0000 0000 1001b = 16#0009 | L278 | 16#0009 |
| | Unused masks: | MS2 = MS3 = MS4 = MR1 = MR2 = MR3 = 0 | | |

### 4.7.1.4 Changeover between format operation and positioning

**Terminology**

Synchronizing and synchronous operation of knife and material are associated with format operation. The material position defines the knife velocity and position. (This is why the material position is known as the reference position).

Positioning operation is used to position the knife back to the starting position. The dynamic performance of this operation must be defined independent of the material motion. This operation must have been complete before the material passes-over the starting position.

The logical conditions for toggling between the two operating modes are shown in Table 4-20. The implementation is shown in the following two tables.

*Table 4-26 Input assignment for toggling between format- and positioning operation (Chart 410)*

| Input | Function | Param | Value | The following is used: |
|---|---|---|---|---|
| I1 | no_enable | L331 | 0665 | *Setpoint not enabled* (Chart 360) |
| I2 | Shears_in_the_starting_position | L332 | 0644 | *In the starting position;* (Chart 340) |
| I3 | Cutting operation | L333 | 0576 | *Cutting operation active* (Chart 320) |
| I4 | Knife_raise_final pulse | L334 | 1257 | *Logic1_QEN* (Chart 415); pulse when terminating the raise operation |
| I5 | Mode_linear axis | L335 | 0120 | *ModeLinear* (Chart 80) |
| I6 | Positioning_active | L336 | 0499 | *PosRG active* (Chart 230) |
| I7 | Positioning | L337 | 1347 | *Mode_Positioning* (Chart 410) |
| I8 | Material cut | L338 | 0236 | *RSFF1_QN* (Chart430) |

*Table 4-27 Selection mask to changeover between format/positioning operation (refer to Table 4-20)*

| No. | Logical equation | Mask value | Param | Value |
|---|---|---|---|---|
| <11> | I4 • I3 • I5 • I8 | MS1 = 0000 0000 1001 1100b = 16#009C | L339 | 16#009C |
| <9> | /I6 • I7 | MR1 = 0010 0000 0100 0000b = 16#2040 | L343 | 16#2040 |
| <12> | I1 ∨ I2 | MR = 0000 0000 0000 0011b = 16#0003 | L346 | 16#0003 |
| | Masks which are not used: | MS2 = MS3 = MS4 = MR2 = MR3 = 0 | | |

The closed-loop control structure is changed when toggling between the two operating modes. In the format mode, the format generator supplies the setpoints for the closed-loop position control, and in the positioning mode, the positioning ramp-function generator (PosRG). The position controller which is disabled is de-activated, which means that when changing over, the integral components do not cause setpoint steps (jumps).

In the format mode, the positioning ramp-function generator receives the actual speed- and position values as actual values. This means that changeover to the positioning mode can be realized jerk-free (there are no steps in the speed- and torque setpoint). A prerequisite is that the positioning ramp generator is operated with the same position- and speed normalization as the knife position sensing (H482, H483).

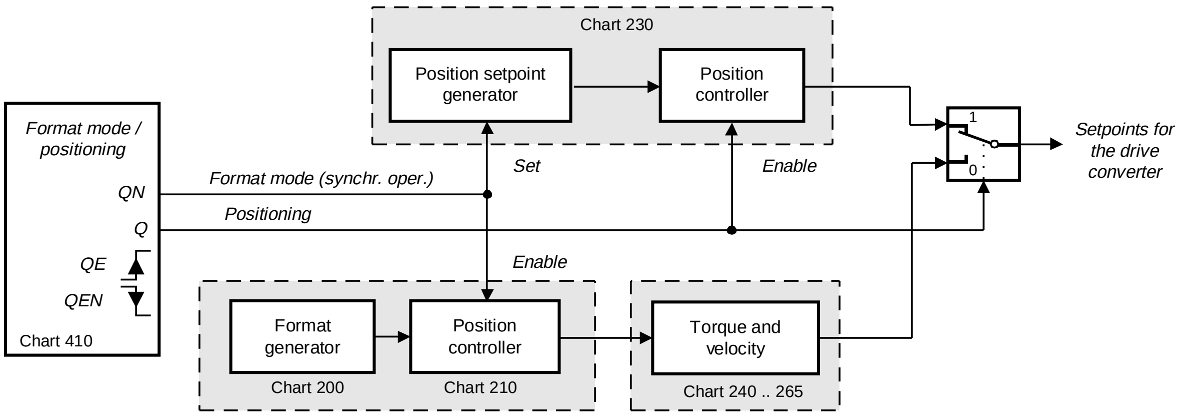



*Fig. 4-16 Changing-over the closed-loop control structure*

### 4.7.1.5 Positioning setpoint generator PosRG

The positioning setpoint generator (Chart 230) supplies normalized setpoints for the position, speed and the torque, taking into account the

- maximum speed (H480)
- maximum acceleration (H481)
- rounding-off (H478)
- final rounding-off (H479)
- initial values for speed (H485) and acceleration

The speed setpoint is used to pre-control the position controller. The setpoint characteristics to approach a new position from standstill are shown in the following diagram. In this particular example, the limit values for speed and acceleration are reached, which is often not the case for short positioning operations.

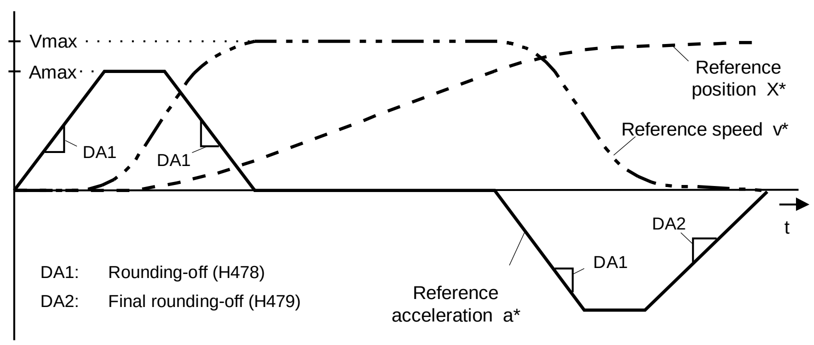



*Fig. 4-17 Setpoint characteristics for a positioning operation from standstill*

### 4.7.1.6 Clamping the knife to the material

The material can also be clamped to the material when running in synchronism using a clamping device. In order to avoid high cantilever forces acting on the knife, the drive torque can be limited during this particular phase.

The clamping device is always controlled when the knife is in the cutting mode, but not in the upper quiescent state. A free AND block is used, and its output is connected to a digital output of the T400.

**Terminal function:** *Clamping function = Knife_not_at the top • Cutting operation*

*Table 4-28 Parameter for the "clamp knife function“*

| Function | Param | Value | The following is used: |
|---|---|---|---|
| Knife at the top | L700 | 0254 | Digital input 4 is inversely used (Chart 110) |
| Cutting operation | L701 | 0576 | *Cutting operation active* (Chart 320) |
| "Clamp knife" output at terminal 49 | H274 | 0700 | Output of the free AND output (Chart 100, 425) |
| Enable terminal 49 | H268 | 1 | Fixed value: ‘1’ = Output |
| Reduce torque | L584 | 0700 | Output of the free AND output (Chart 425, 240) |
| Value for the reduced torque | L587 | 0.1 | Fixed value 10% of the reference torque |

### 4.7.1.7 Referencing to a linear axis

When using an incremental encoder for the knife position, after the system has been powered-up, initially the absolute knife position is not known. Thus, a reference approach (at a low velocity) is required, or absolute value encoders must be used for position sensing.

For rotary axes, the direction of movement when referencing is irrelevant. However, for linear systems, the knife may only move within the range between the two limit switches. For this reason, the closed-loop cut to lengths includes an automatic reversing function when the limit switch is reached in the referencing mode (Chart 260).

In this case, the limit switches must be connected with the reversing logic with L530 and L531. The referencing velocity and direction are set using L542.

### 4.7.2 Flying saw

For the "flying saw" using the knife feed, the knife is synchronized to the material velocity and the material cut. (as a comparison: For "flying knife", the knife is moved up/down using, for example, an independent hydraulic system).

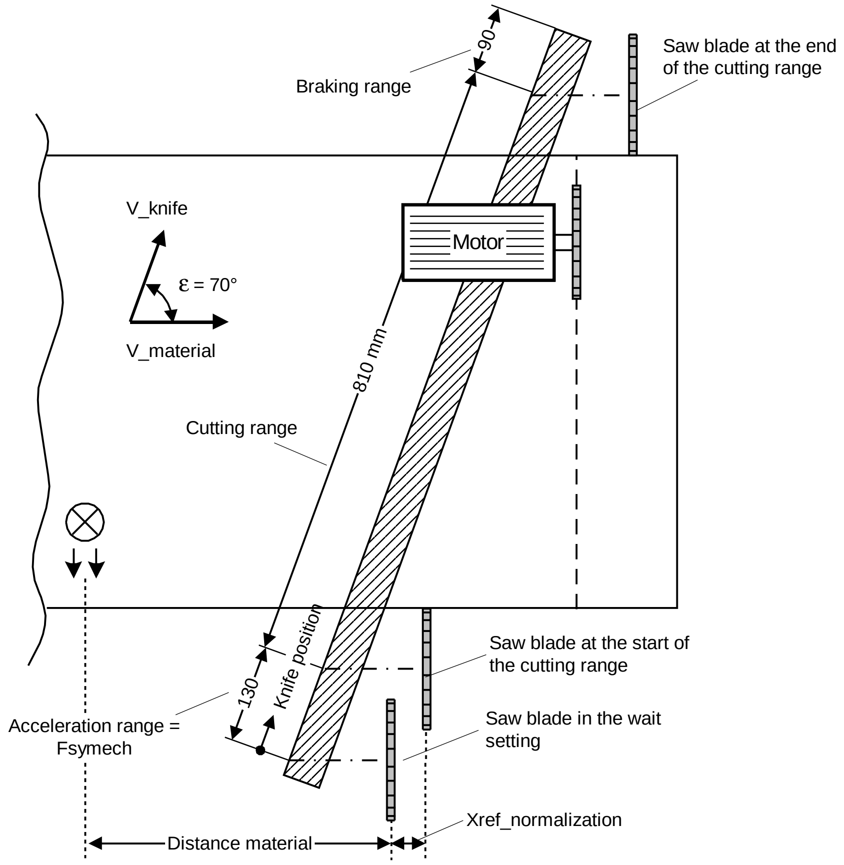



*Fig. 4-18 Principle of a "flying saw" system*

In the diagram above, it can be clearly seen that the material and the saw slides move in different directions. For the internal normalization operations, the cosine of the angle is required. In this case, the position- and velocity components of the knife motion are calculated in the material flow direction. The knife coordinates count in the movement direction of the knife. The knife position = 0 in the waiting position (starting position) of the knife.

This example assumes that the knife is braked after cutting, raised above the material and moved back to the starting position. There, it is lowered and waits for the next cut. This starts when the material exceeds a certain position (start length; this is internally calculated).

*Table 4-29 Special system-specific parameters for the "flying saw" example*

| Param | Value | Quantity | Significance |
|---|---|---|---|
| H100 | 130.0 mm | *X_Shear Norm* | Maximum knife acceleration. |
| H101 | 0.0 mm | *AX* | The starting position is defined as 0 using H101 and H103. |
| H102 | 110.0 mm | *AY* | The knife should run in synchronism with the material 20 mm before the end of the acceleration travel (example). |
| H104 | $10\ ^{m}/_{min}$ | *Reference Speed* | Maximum material velocity |
| H105 | 130.0 mm | *Fsymech* | Identical, *XShear Norm* |
| H108 | 70.0° | *Epsilon* | Angle ε in Fig. 4-18 |
| H117 | | *Feed/Revolution* | Knife feed for one revolution of the motor for saw slides. (refer to Chart 80). |
| H120 | 1 | *Mode LinearAxis* | Linear axis |
| H122 | | *Distance material* | Distance between the light barrier and the end of the accelerating range (from here onwards, the knife is located above the cutting position. |
| H197<br>L201 | 3441<br>3168 | *S.SV_Startlength*<br>*S.RefPos Limit* | Shifting the web coordinate system. Thus the distance to light barrier is related to the start position of the knife. |

The coordination of the motion sequences is comparable with the "flying knife" example. The decisive difference is that the saw is raised and lowered outside the cutting range.This means that immediately after cutting the material, it is not possible to start re-positioning the knife. In this example, positioning is sub-divided into two phases:

1. Approach a wait position after the cutting range as long as the saw has not been raised.
2. As soon as the saw is in the up position, position to the starting position.

*Table 4-30 Logical equations for the "flying saw" example ( '•' = AND; '∨' = OR )*

| Function/status | No. | Logical equations |
|---|---|---|
| Start, raise saw | <14><br><15> | ( no cutting operation • Manual operation_UP )<br>∨ ( Saw_after_the_cutting range • cutting operation ) |
| Stop, raise saw<br>(dominant) | <16><br><17> | no_enable ∨ saw_top<br>v ( no_cutting operation • no_manual operation_UP ) |
| Start, lower saw | <14><br><15> | (cutting operation • saw_in the_accelerating range )<br>v (no_cutting operation • manual operation_DOWN • no_manual operation_UP ) |
| Stop, lower saw (dominant) | <16><br><17> | ( no_cutting operation • no_manual operation_DOWN )<br>v no_enable ∨ saw_bottom |
| Start positioning = stop formatting | <18> | Saw_after_cutting range • cutting operation • mode_linear axis |
| Start formatting<br>(dominant) | <19><br><20> | No_enable ∨ shears_in the_start position<br>∨ (positioning_not_active • positioning ) |
| Target position: after the cutting range | | Saws_after_cutting range • saws_not_on top |
| Target position: Starting position | | Otherwise |

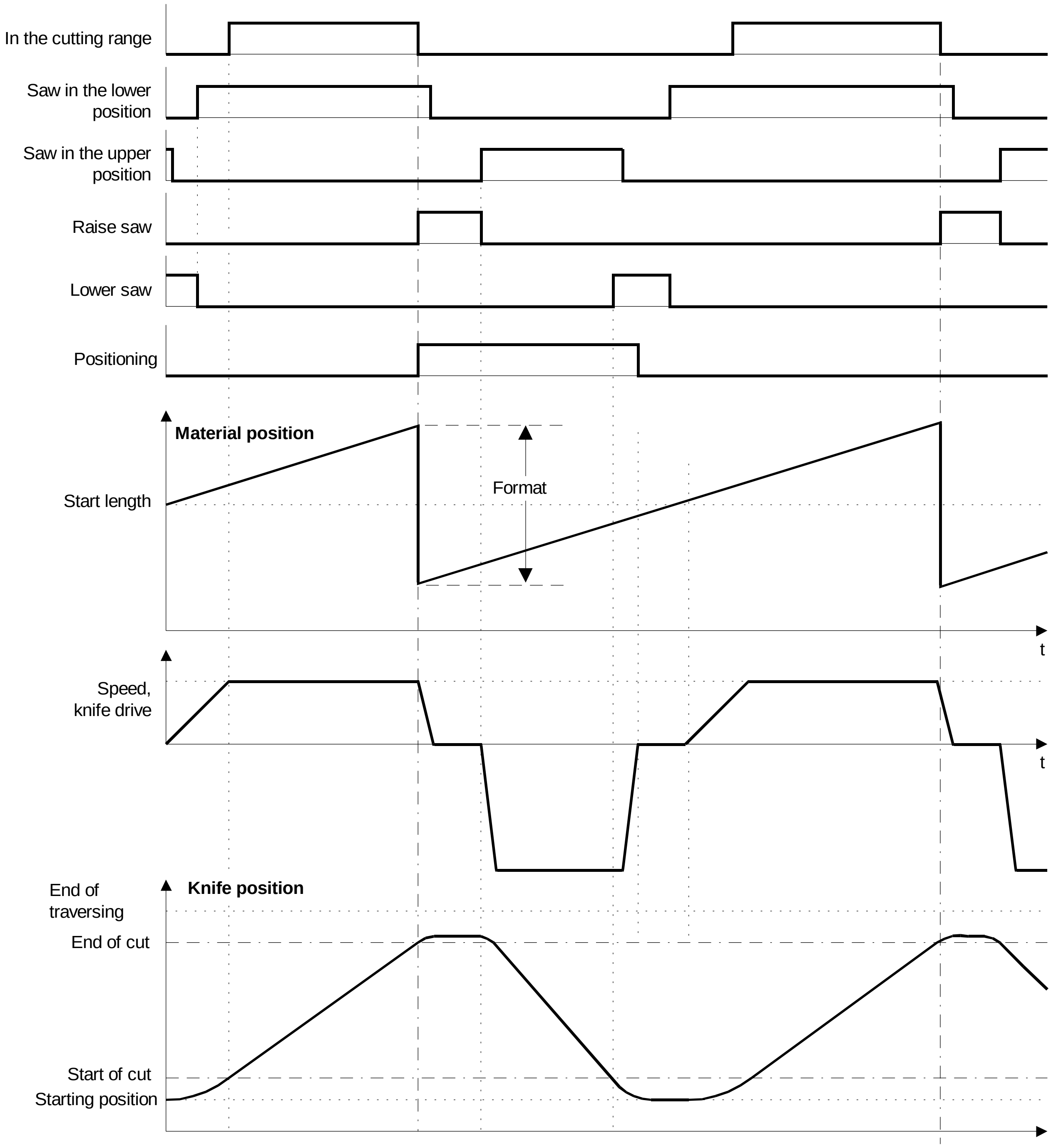



*Fig. 4-19 Timing for the "flying saw" example*

The control functions for raising and lowering the saws are implemented as well as the changeover between format- and positioning operation with the parameterizable STATE logic (Chart 415). The logic to changeover the target coordinates when positioning is a free AND logic gate (Chart 425).

The required parameters and connection changes are summarized in the following table.

*Table 4-31 Input assignment for the "raise saw" function (first STATE block in Chart 415)*

| Input | Function | Param | Value | The following is used: |
|---|---|---|---|---|
| I1 | No enable | L243 | 0665 | *No setpoint enable* (Chart 360) |
| I2 | Cutting operation | L244 | 0576 | *Cutting operation* (Chart 320) |
| I3 | Saw in the upper position | L245 | 0244 | Digital input 4 is used |
| I5 | Saw, rear cutting range | L247 | 0218 | *Range1_overflow* (Chart 350)<br>Upper limit to fixed value 1: L215 = 3650 |
| I7 | Manual operation_UP | L249 | 0000 | Not assigned in the factory setting |

*Table 4-32 Selection masks for the "raise saw" function (refer to Table 4-30)*

| No. | Logical equation | Mask value | Param | Value |
|---|---|---|---|---|
| <14> | /I2 • I7 | MS1 = 0000 0010 0100 0000b = 16#0240 | L251 | 16#0240 |
| <15> | I2 • I3 | MS2 = 0000 0000 0000 0110b = 16#0006 | L252 | 16#0006 |
| <17> | /I2 • /I7 | MR1 = 0100 0010 0000 0000b = 16#4200 | L255 | 16#4200 |
| <16> | I1 ∨ I3 | MR = 0000 0000 0000 0101b = 16#0005 | L258 | 16#0005 |
| | Masks which are not used: | MS3 = MS4 = MR2 = MR3 = 0 | | |

*Table 4-33 Input assignment for the "lower saw" function: 2nd STATE block in Chart 415)*

| Input | Function | Param | Value | The following is used: |
|---|---|---|---|---|
| I1 | No enable | L263 | 0665 | *Setpoint is not enabled* (Chart 360) |
| I2 | Cutting operation | L264 | 0576 | *Cutting operation* (Chart 320) |
| I3 | Saw in the lower position | L265 | 0245 | Digital input 5 is used |
| I4 | Saw, rear cutting range | L266 | 0218 | *Range1_overflow* (Chart 350)<br>Upper limit to fixed value1: L215 = 3650 |
| I5 | Saw in the accelerating range | L267 | 0454 | *In the format range* (Chart 330) |
| I7 | Manual operation_UP | L269 | 0000 | Not assigned in the factory setting |
| I8 | Manual operation_AB | L270 | 0000 | Not assigned in the factory setting |

*Table 4-34 Selection masks for the "lower saw" function (refer to Table 4-30)*

| No. | Logical equation | Mask value | Param | Value |
|---|---|---|---|---|
| <18> | I2 • I5 | MS1 = 0000 0000 0001 0010b = 16#0012 | L271 | 16#0012 |
| <19> | /I2 • I8 • /I7 | MS2 = 0100 0010 1000 0000b = 16#4280 | L272 | 16#4280 |
| <20> | /I2 • /I8 | MR1 = 1000 0010 0000 0000b = 16#8200 | L275 | 16#8200 |
| <21> | I1 ∨ I3 | MR = 0000 0000 0000 0101b = 16#0005 | L278 | 16#0005 |
| | Masks which are not used: | MS2 = MS3 = MS4 = MR1 = MR2 = MR3 = 0 | | |

*Table 4-35 Parameters to changeover the target position when positioning*

| Param | Value | Significance |
|---|---|---|
| H476 | 3651 | Source of the target position after the cutting range = fixed value 2 |
| H477 | 0700 | Source to change over the target position = output of the free AND logic gate AND1 |
| L215 | 3652 | Connect upper limit value of the range indicator to fixed value 1 |
| L700 | 0218 | Connect 1st input from AND1 with *range1_overflow* ⇒ saw is in the rear cutting range |
| L701 | 0254 | Connect 2nd input from AND1 with *digital input 4 inverse* ⇒ saw is not in the upper position |
| L720 | 940.0 | Fixed value1 = 130 mm + 810 mm = 940 mm; end of the cutting range (Fig. 4-18) |
| L721 | 960.0 | Fixed value2 = wait position, until the saw was raised |

# 5 Appendix

## 5.1 Abbreviations

| | |
|---|---|
| AA | Analog output |
| AE | Analog input |
| AENC | Absolute value encoder processing |
| AX | Angle where the knife looses contact to the web |
| AY | Angle where the knife get in contact with the web |
| AZ | Symmetry of speed transitions between two cuts |
| Calib | Calibrating the knife position (define the absolute position) |
| CB | Communications module |
| CTW | Control word |
| CU | Processor module of the basic drive |
| DW | Double word (32bit-word) |
| EPC | Enable position controller |
| FC | Format controller |
| FGEN | Format generator (setpoint generator for motion sequences) |
| KP | Proportional gain |
| M_max | Maximum torque |
| M_soll | Reference torque |
| N2 | 16-bit fixed-point format (0x4000 corresponds to 100%) |
| N4 | 32-bit fixed-point format (0x40000000 corresponds to 100%) |
| PC | Position controller |
| PosRG | Positioning setpoint generator |
| PZD | Process data |
| Q. | Source for a signal |
| SCTW | Shears control word (also shear SCTW) |
| T | Smoothing time constant |
| TD | Differentiation time constant |
| TR | Manufacture for incremental encoders with combined absolute position |
| V_Ref | Referencing velocity (material velocity) |
| V_soll | Velocity setpoint |
| Word | 16-bit data word |
| Doubleword | 32-bit data word |

## 5.2 Terminology

| | |
|---|---|
| Automatic mode | Continous cutting operation. Contrary to manually caused operations like jogging or manual single cut. |
| Format operation | Operation with the format generator as setpoint generator for position- and speed setpoints |
| Format range | Knife position range, in which the knife moves asynchronously with the material (rotary axis: acceleration or braking; linear axis, acceleration) |
| Positioning | Operation with the positioning ramp generator as setpoint generator for position- and speed setpoints |
| Reference ... | Values concirning the web (material); e.g.: reference position = web position |
| Start length | If the web position passes this particular value the shear starts accelerating. (Only valid for a operation where the shear stands still between wo cuts). |
| Starting position | When the material passes the starting position, the knife starts to synchronize with the material. Before this, the knife is in the quiescent position. |
| Synchronous range | The range of the shear positions where the shears runs synchronous with th web. |

## 5.3 Literature


1. Instruction Manual for SIMOVERT Master Drives -- Vector Control (VC), Sizes A to D, Order No.: 6SE7080-0Ad20, 1995.

2. Instruction Manual for SIMOVERT Master Drives -- Communications modules CB1, Order No: 6SE7087-6CX84-0AK0, 1994.

3. Communications configuring D7-SYS- SIMADYN D - Manual, Order No. 6DD1987-1AA1, Oct. 1997.

4. Hardware - SIMADYN D - Manual, Order No. 6DD1987-1BA1, 1997.

5. SIMADYN D, Function Block Library, Reference Manual, Order No. 6DD1987-1CA1, October 97.


## 5.4 Changes

**Edition 06/99** First Edition

# 6 Parameters and Connectors

## 6.1 Important information

The **parameter name** displayed at the OP1S is a maximum of 16 characters long. You can toggle between *German* and *English* using the initialization parameter H000 (reset is required after a change has been made).

For several parameter types, **rounding-off errors** can be expected due to the limited resolution at data input or as a result of conversion operations. Further, in some instances, more decimal points are offered than can actually be set.

All of the parameters, used for the closed-loop cut to length are listed on the following pages. The listing is realized in the following form:

*Table 6-36 Listing type for input- or display parameters*

| Parameter | Description | Data |
|---|---|---|
| Hxyz (Lxyz)<br>Parameter designation<br>*Initialization parameter* | Parameter description for a selectable technology parameter<br>Parameters with the *initialization parameter* supplement, mean that when this parameter is changed it only becomes effective after the power supply voltage has been powered-up again. | Value, factory setting type<br>Min lower limit<br>Max upper limit<br>Unit Units<br>Chart Number, Sector |
| dxxx (cxyz)<br>Parameter designation | Parameter description for a visualization parameter (this cannot be set). The "d" or "c" symbolize the offset values<br>1000 („d") or 3000 („c") . This must be taken into account when selecting the parameters with OP1(S). | Type<br>Unit Units<br>Chart Number, Sector |

*Table 6-37 Data types and range when parameterizing using the OP1S*

| Type abbrev. | Type | Significance | Example display at OP1S | Value range OP1S |
|---|---|---|---|---|
| BO | BOOL | Logical quantity | 0 | 0, 1 |
| I | INT | Integer number; signed | -12345 | -32768 ...32767 |
| W | WORD | Integer number; unsigned; hexadecimal and digital, displayed at OP1(S); hexadecimal representation in the documentation start with „16#". | 2F03Hex<br>0010111100000011 | 16#0000 ... 16#FFFF<br>(0 ... 65535) |
| DI | DINT | Double integer number (32 bit); signed | 123456789 | ±2147483647 |
| R | REAL | Floating-point number. The entry made with OP1(S) is limited to 6 positions before and after, whereby the range is limited 199999.999. | 123456.789 | ±2147483.647 |
| SD | SDTIME | Time in [ms] or [s] | 200.000 ms | 0 ... 2147483.647 ms |

## 6.2 Parameters

| Parameter | Description | Data |
|---|---|---|
| H000<br>Language select.<br>*Initialization param.* | 0 = German<br>1 = English | Value 0<br>Type I<br>Chart 50,1 |
| d001<br>Software-Id | Software ID for the standard software package<br>450 = Cross-cutters<br>455 = Closed-loop shears control | Type I<br>Chart 50,3 |
| d002<br>Software version | Software version number of the standard software package | Type I<br>Chart 50,3 |
| d003<br>Serial number | Plant/system identification<br>can be changed using H923 | Type DI<br>Chart 50,3 |
| d004<br>Hardware-Id | Module identification<br>T400: 144 | Type I<br>Chart 50,3 |
| d005<br>Status BinInput | Status of the digital inputs, terminal 53 (bit 0) to terminal 60 (bit 8). The least-significant 8 bits are the actual input level, the upper 8 bits, the inverse signal level. | Type W<br>Chart 110,8 |
| d010<br>System status | Error status of the SIMADYN D system software. '1' means "Error".<br>Bit 3 Error, task administration<br>Bit 5 Hardware fault<br>Bit 6 Communications error<br>Bit 10 User error | Type W<br>Chart 510,2 |
| d012<br>Control Word1 CU | Control word1 for the basic drive<br>Bit 0 On (main contactor) 1=ON<br>Bit 1 /OFF2 (voltage-free) 0=OFF<br>Bit 2 /OFF3 (fast stop) 0=OFF<br>Bit 3 Pulse enable<br>Bit 4 Ramp-function generator enable<br>Bit 5 Start, ramp-function generator<br>Bit 6 Setpoint enable 1=Enable<br>Bit 7 Acknowledge fault 1=Acknowledge<br>Bit 8 Jogging 1<br>Bit 9 Jogging 2<br>Bit 10 Control requested **this must be a '1' !**<br>Bit 11 Enable, positive direction of rotation<br>Bit 12 Enable, negative direction of rotation<br>Bit 13 Motorized potentiometer, raise<br>Bit 14 Motorized potentiometer, lower<br>Bit 15 Fault, external 1 | Type W<br>Chart 630,4 |
| d013<br>Control Word2 CU | Control word2 for the basic drive | Type W<br>Chart 630,8 |
| d014<br>Actual Faults | The *error word* comprises the *error bits* which resulted in a fault trip. It is generated by masking the *fault message enable* (H966) with the *error bits* (d968). The assignment of the *error bits* is defined using parameters H950 ... H965. Error sources in the factory setting:<br>Bit 0 Communications via CB<br>Bit 1 Communications to the basic drive<br>Bit 2 Not assigned<br>Bit 3 User error 1<br>Bit 4 User error 2<br>Bit 5 Knife position is lower than the lower limit value<br>Bit 6 Overspeed, knife (positive)<br>Bit 7 Overspeed, knife (negative)<br>Bit 8 Knife drive blocked<br>Bit 9 Pulse encoder error (speed actual value not plausible)<br>Bit 10 External fault 1<br>Bit 11 External fault 2<br>Bit 12 Knife position greater than the upper limit value<br>Bit 13 Material position less than the lower limit value<br>Bit 14 Fault, absolute value encoder (TR encoder)<br>Bit 15 Not assigned | Type W<br>Chart 530,7 |
| d015<br>Actual Alarm | The *alarm word* comprises the *error bits* which resulted in an alarm being displayed. It is generated by masking the *alarm enable* (H967) with the *error bits* (d968). Assignment, refer to d014. | Type W<br>Chart 530,7 |

| Parameter | Description | Data |
|---|---|---|
| d016<br>Status Cntrl Logic | Status word of the control. Assignment:<br>Bit 0 Position input of the TR encoder<br>Bit 1 Not assigned<br>Bit 2 Position controller enable<br>Bit 3 Knife at the start position<br>Bit 4 Fast stop from CU (basic drive, status word1.5)<br>Bit 5 Knife stationary<br>Bit 6 Drive converter ready<br>Bit 7 Fault, TR encoder (at start, read the absolute position)<br>Bit 8 Fault, TR encoder (no position pulses)<br>Bit 9 Fault, TR encoder (timeout)<br>Bit 10 Setpoint enable<br>Bit 11 Knife is calibrated<br>Bit 12 Fault<br>Bit 13 Brake open<br>Bit 14 Knife moving<br>Bit 15 Inverter enabled | Type W<br>Chart 510,7 |
| d017<br>Status Shear | Status word of the shears. Assignment:<br>Bit 0 Knife is calibrated<br>Bit 1 Knife in the synchronous range<br>Bit 2 Knife in the format range<br>Bit 3 Knife at the start position<br>Bit 4 Knife at the change position<br>Bit 5 Cutting program completed<br>Bit 6 Synchronizing pulse of the knife transmitter (extended to 100 ms)<br>Bit 7 ...<br>Bit 15 Freely assignable; source selected using H547 ... H555 | Type W<br>Chart 520,4 |
| d020<br>Factor Overspeed | The knife velocity when in synchronism is obtained from the material speed multiplied by the o*verspeed factor* | Type R<br>Chart 265,4 |
| d021<br>SpeedSetp_Cut | Setpoint of the knife speed for cutting. Normalized quantity (1.0 corresponds to the reference speed) | Type R<br>Chart 250,6 |
| d022<br>Sheet Counter | Number of cut sheets since the power-supply was powered-up or the counter status was reset. | Type I<br>Chart 520,8 |
| d023<br>Speed setp | Setpoint of the knife speed (in cutting- or local operation). Normalized quantity (1.0 corresponds to the reference speed) | Type R<br>Chart 260,8 |
| d024<br>d_Absolut Pos. | Position value from the absolute value encoder in the user normalization. | Type R<br>Chart 150,8 |
| d025<br>Torque Setp | Setpoint torque for format operation. Normalized to the reference torque. | Type R<br>Chart 240,7 |
| d026<br>TorqAcceleration | Torque as a result of the acceleration for format operation. Normalized to the reference torque. | Type R<br>Chart 240,3 |
| d027<br>Oscill. Torque | Oscillating torque in the format mode. Normalized to the reference torque. | Type R<br>Chart 240,3 |
| d028<br>Cutting Torque | Cutting torque in the format mode. Normalized to the reference torque. | Type R<br>Chart 240,4 |
| d029<br>Friction | Friction torque in the format mode. Normalized to the reference torque. | Type R<br>Chart 460,8 |
| d040 .. d047<br>Display R1 ...<br>Display R8 | Monitoring parameters, R type (floating point).<br>**Par. Source selection Factory setting assignment**<br>d040 L940 3401 Reference speed of the shears<br>d041 L941 3050 Revolutions/Fsymech<br>d042 L942 3421 Reference speed 2<br>d043 L943 3440 Position for synchronizing 2<br>d044 L944 3498 Mset when positioning<br>d045 L945 3192 Suppl. angle from the cutting curve<br>d046 L946 3099 Light barriers + clearance cut<br>d047 L947 3094 3099 Modulo Fsymech | Type R<br>Chart 540,5 |
| d048 .. d051<br>Display W1 ...<br>Display W4 | Monitoring parameters, word type (16-bit, unsigned).<br>**Par. Source selection Factory setting assignment**<br>d048 L948 2776 Test value 1<br>d049 L949 2785 Simulation-shears control word<br>d050 L950 2671 Fixed value I1<br>d051 L951 2672 Fixed value I2 | Type W<br>Chart 540,5 |

| Parameter | Description | Data |
|---|---|---|
| d056 .. d059<br>Display I1 ...<br>Display I4 | Monitoring parameters, integer type (16-bit, signed).<br>**Par. Source selection Factory setting assignment**<br>d056 L956 2302 PZD2 from CU (speed actual value)<br>d057 L957 2809 PZD9 from CB<br>d058 L958 2802 PZD2 from CB<br>d059 L959 2806 PZD6 from CB | Type W<br>Chart 540,7 |
| d064 .. d067<br>Display B1 ...<br>Display B4 | Monitoring parameter, BOOL type.<br>**Par. Source selection Factory setting assignment**<br>d064 L964 0317 Enable synchronization<br>d065 L965 0172 Enable format controller<br>d066 L966 0567 Continuous sheet length<br>d067 L967 0412 Knife speed, negative | Type W<br>Chart 540,7 |
| d068 .. d071<br>Display DI1 ...<br>Display DI4 | Monitoring parameter, double integer type (32-bit, signed).<br>**Par. Source selection Factory setting assignment**<br>d068 L968 5402 Reference pulses 1<br>d069 L969 5422 Reference pulses 2<br>d070 L970 5061 Peer DW1<br>d071 L971 5063 Peer DW2 | Type DI<br>Chart 540,7 |
| H091<br>S.AX | Source for the angle at which the knife no longer is in contact with the material. | Value 3101<br>Type I<br>Chart 60,3 |
| H092<br>S.AY | Source for the angle at which the knife comes in contact with the material. | Value 3102<br>Type I<br>Chart 60,3 |
| H095<br>S.DistLight Gate | Source for the clearance (in [mm]) between the light barrier and knife | Value 3106<br>Type I<br>Chart 60,3 |
| H096<br>S.Dist. cut | Source for the distance (in [mm]) between the light barrier and cut | Value 3107<br>Type I<br>Chart 60,3 |
| H097<br>S.TopCut size | Source for the *crop length* (in [mm]). If a crop cut is enabled, a sheet is cut, with the *crop length* at the start of the material web. | Value 3110<br>Type I<br>Chart 60,3 |
| H098<br>S.Long format | Source for the *Long Format* (in [mm]). The Long Format is a cut length, which is long enough that the knife must wait in the quiescent position between two cuts (also at the reference speed of the material web). | Value 3111<br>Type I<br>Chart 60,3 |
| H100<br>X_Shear Norm | Normalization factor to enter and display knife coordinates. For application with rotary axis, use 360.0 (angular degrees), for systems with linear axis, enter *Fsymech* (H105). | Value 360.0<br>Type R<br>Chart 60,3 |
| H101<br>AX Angle | Rotary axis: Angle at which the knife no longer is in contact with the material.<br>Linear axis: 0.0 | Value 20.0<br>Type R<br>Chart 60,3 |
| H102<br>AY Angle | Rotary axis: Angle at which the knife comes into contact with the material.<br>Linear axis: Distance from the starting position, where the knife must run in synchronism. This value must be ≤ Fsymech! | Value 340.0<br>Type R<br>Chart 60,3 |
| H103<br>Edge point AZ | Sub-division of the format range (velocity profile of the knife motion) into an accelerating- and braking range. The ratio of the ranges is defined using H103.<br>Example: For H103 = 0.6, 60% of the format range is available for acceleration and 40% for braking. | Value 0.5<br>Type R<br>Chart 60,6 |
| H104<br>Reference Speed | Maximum material web speed in [m/min]. | Value 100 m/min<br>Type R<br>Chart 80,4 |
| H105<br>Fsymech | Mechanical synchronous format.<br>Rotary axis: Knife travel between 2 cuts<br>Linear axis: Maximum acceleration travel | Value 1000 mm<br>Type R<br>Chart 60,6 |
| H106<br>Dist. Light Gate | Fixed value for the distance between the light barriers and the knife in the 1.0 position (the normalized knife position; corresponds to Fsymech for non-normalized position) | Value 1500 mm<br>Type R<br>Chart 60,3 |
| H107<br>Dist. Cut | Fixed value for the distance (in [mm]) between the light barrier and cut | Value 0.0 mm<br>Type R<br>Chart 60,5 |

| Parameter | Description | Data |
|---|---|---|
| H108<br>Epsilon | Angle between the velocity vectors of the knife and material web | Value 0.0°<br>Type R<br>Chart 60,6 |
| H109<br>Knife Change Pos | Knife position, to which the knife is positioned in the local mode "Approach knife change position" | Value 180.0<br>Type R<br>Chart 60,5 |
| H110<br>TopCut size | Fixed value for the *crop length* (in [mm]). If a crop cut is enabled, a sheet with the *crop length* is cut at the start of the material web. | Value 200.0 mm<br>Type R<br>Chart 60,3 |
| H111<br>Long format | Fixed value for the *Long Format* (in [mm]). The Long Format is a cut length, which is large enough that the knife must remain in the quiescent position between two cuts (also for the reference speed of the material web). | Value 100.0 m<br>Type R<br>Chart 60,3 |
| H112<br>Angle_CUT_ON | Starting position for the cut torque input | Value 315.0<br>Type R<br>Chart 60,6 |
| H113<br>Angle_CUT_OFF | End position for the cut torque input | Value 345.0<br>Type R<br>Chart 60,6 |
| d114<br>Xref_Norm | Normalization factor for the material position. Corresponds to Fsymech for all applications, where the knife and the material have the same direction of movement. | Type R<br>Chart 60,7 |
| H115<br>SizeMeas. Wheel | Circumference of the measuring wheel to sense the material position | Value 500 mm<br>Type R<br>Chart 80,1 |
| H116<br>i_Meas. Wheel | Gearbox ratio for the material position sensing. This is required if the feed drive encoder is used for position sensing.<br>Definition: speed_encoder = i_measuring wheel · speed_measuring wheel | Value 1.0<br>Type R<br>Chart 80,1 |
| H117<br>Feed/Revolution | Knife movement for one revolution of the knife feed drive. (Refer to the application example) | Value 1000 mm<br>Type R<br>Chart 80,1 |
| H118<br>i_Encoder1 | Gearbox ratio of the knife encoder.<br>Definition: speed_knife encoder = i_encoder1 · speed_knife | Value 1.0<br>Type R<br>Chart 80,4 |
| d119<br>n_Ref. Shear | Calculated reference speed of the shear drive. | Type R<br>Chart 80,6 |
| H120<br>Mode Linear Axis | Enables positioning functions for applications with linear axis. | Value 0<br>Type BO<br>Chart 410,1 |
| H121<br>S.Slip Factor | Source for a factor to correct the gearbox ratio and the measuring wheel circumference. Factors greater than 1.0 simulate a slower material movement as displayed from the encoder. | Value 3001<br>Type BO<br>Chart 80,1 |
| H122<br>Distance Material | Clearance between the light barrier for material detection and the knife. | Value 1500 mm<br>Type R<br>Chart 60,6 |
| H123<br>S.Meas.WheelCorr | Source for correction value to adapt the circumference of the measuring wheel. | Value 3000<br>Type I<br>Chart 80,1 |
| H124<br>S. SetPosition 1 | Source for the main position reference value of the angular controller for cutting mode types. This is the position reference value of the format generator as standard. | Value 3157<br>Type I<br>Chart 210,1 |
| H125<br>S. SetPosition 2 | Source for the auxiliary position reference value of the angular controller for cutting mode types. This is the supplementary setpoint from the cutting curve as standard. | Value 3192<br>Type I<br>Chart 210,1 |
| H126<br>S. SetPosition 3 | Source for a supplementary position reference value. | Value 3000<br>Type I<br>Chart 210,1 |
| H127<br>S. SetPosition 4 | Source for the position reference value of the angular encoder in the "Approach start position" operating mode. | Value 3161<br>Type I<br>Chart 210,1 |
| H128<br>S. SetPosition 5 | Source for the position reference value of the angular controller in the "Approach knife change position" operating mode. | Value 3129<br>Type I<br>Chart 210,1 |

| Parameter | Description | Data |
|---|---|---|
| H129<br>S. GotoKnifeChPos | Source for changing-over to the position reference value “Reference position 4”. As standard, this is connected to the control signal “Approach knife change position“. | Value 0596<br>Type I<br>Chart 210,1 |
| H130<br>S. GotoStartPos | Source to changeover from the position reference value “Reference position 3“. This is connected as standard to the control signal “Approach start position“. | Value 0595<br>Type I<br>Chart 210,1 |
| H131<br>S. ActValuePosPC | Source of the position actual value for the position controller. This is connected, as standard with “Knife position“. | Value 3414<br>Type I<br>Chart 210,4 |
| d132<br>Deviation PC | System deviation of the position controller. | Type R<br>Chart 210,5 |
| H133<br>PosReg_Max_cut | Positive position controller limit value for cutting operation | Value 1.0<br>Type R<br>Chart 210,2 |
| H134<br>PosReg_Max_loc | Positive position controller limit value for local operation | Value 0.1<br>Type R<br>Chart 210,2 |
| H135<br>PosReg_Min_cut | Negative position controller limit value for cutting operation | Value -1.0<br>Type R<br>Chart 210,2 |
| H136<br>PosReg_Min_loc | Negative position controller limit value for local operation | Value -0.1<br>Type R<br>Chart 210,2 |
| H137<br>S. Max. Setp. Pos | Source of the upper limit of the knife position for the setpoint of the position controller. Used to stop the knife in linear applications. | Value 3707<br>Type<br>Chart 210,4 |
| H138<br>S. Min. Setp. Pos | Source of the lower limit of the knife position for the setpoint of the position controller. Used to stop the knife in linear applications. | Value 3705<br>Type<br>Chart 210,4 |
| H139<br>S. PC Enable | Source for the position controller enable. | Value 0671<br>Type I<br>Chart 210,4 |
| H140<br>PC Test Setp | Test setpoint to enter a setpoint (reference value) step into the position controller. | Value 0.0<br>Type R<br>Chart 210,4 |
| H141<br>S. PC_set YI=0 | Source for the control signal to delete the integral component of the position controller.<br>Connected to ‘1’ as standard; i. e. the integral component is de-activated. | Value 0001<br>Type I<br>Chart 210,4 |
| H142, H143<br>dMeas.Wheel_max,<br>dMeas.Wheel_min | Maximu and minimum value for the adaption of the measuring wheel circumference. | Value ±20 mm<br>Type R<br>Chart 80,1 |
| d144<br>Output PC filt | Position controller output, smoothed. | Type R<br>Chart 210,8 |
| d145<br>IntegratorVal PC | Integral component of the position controller. | Type R<br>Chart 210,6 |
| H146<br>KP Pos. Ctrl | Proportional Gain of the position controller. | Value 2.5<br>Type<br>Chart 210,5 |
| H147<br>TN Pos.Ctrl | Integral action time TN of the position controller | Value 6 ms<br>Type SD<br>Chart 210,5 |
| H148<br>Tfilt PC | Smoothing time constant of the position controller output | Value 4.8 ms<br>Type SD<br>Chart 210,7 |
| H150<br>S. FGEN Format | Source for the (normalized) cutting format for the format generator.<br>This is connected to the format controller output as standard. | Value 3184<br>Type I<br>Chart 200,3 |
| H151<br>S. FGEN V_Ref | Source for the (normalized) material web speed for the format generator.<br>This is connected to the smoothed material web speed as standard. | Value 3435<br>Type I<br>Chart 200,3 |

| Parameter | Description | Data |
|---|---|---|
| H152<br>S. FGEN RefPos | Source for the (normalized) material position for the format generator.<br>This is connected to the material position, weighted with the overspeed factor as standard. | Value 3197<br>Type I<br>Chart 200,3 |
| H153<br>S. Speedfactor | Source for the overspeed factor. For overspeed factor values greater than 1.0, the knife moves faster than the material web when cutting. | Value 3020<br>Type I<br>Chart 200,3 |
| H154<br>FGEN Curve Typ | Selects the velocity profile for the knife movement:<br>0: Sinusoidal sections<br>1: Linear ramps<br>2: Linear ramps with rounding-off | Value 0<br>Type I<br>Chart 200,3 |
| d155<br>FGEN error code | Error code format generator<br>Bit 0: FMT < 0 Bit 5: MOD not valid<br>Bit 1: AX not valid Bit 6: OVS not valid<br>Bit 2: AY not valid Bit 7: Hardlock missing<br>Bit 3: AZ not valid Bit 8: not enough memory | Type I<br>Chart 200,7 |
| d157<br>FGEN_Xsetp | Form generator, output knife reference position (normalized) | Type R<br>Chart 200,6 |
| d158<br>FGEN_Vsetp | Form generator, output knife setpoint speed (normalized) | Type R<br>Chart 200,7 |
| d159<br>FGEN_sin*sin | Format generator, output sin² (knife position) | Type R<br>Chart 200,7 |
| d160<br>Electric Format | Cutting format referred to the format generator output, multiplied by the overspeed factor | Type R<br>Chart 200,6 |
| d161<br>Start Position | Format generator, output starting position (quiescent position) of the knife (normalized) | Type R<br>Chart 200,7 |
| d162<br>Start length | Format generator, output starting length (normalized). If the position of the material web exceed the starting length, the knife starts its synchronizing operation. | Type R<br>Chart 200,7 |
| d163<br>AREF for AZ | Format generator, output material position (normalized), where the knife reaches the transition point in the velocity profile (the knife comes to a standstill for larger format lengths). | Type R<br>Chart 200,6 |
| d164<br>Acc Phase1 | Format generator, output maximum knife acceleration before transition point AZ is reached. | Type R<br>Chart 200,7 |
| d165<br>Acc Phase2 | Format generator, output maximum knife acceleration between the transition point AZ and the start of the cut. | Type R<br>Chart 200,7 |
| d166<br>FGEN Diagnostic 1 | Format generator, 1st diagnostics output | Type R<br>Chart 200,6 |
| d167<br>FGEN Diagnostic 2 | Format generator, 2nd diagnostics output | Type R<br>Chart 200,7 |
| d168<br>FG in CutReg | Format generator output, shears in the cutting range.<br>**Caution**: This output is only valid for cutting operation! | Type BO<br>Chart 200,6 |
| d169<br>FG in FormatReg | Format generator output, shears in the format range.<br>**Caution**: This output is only valid for cutting operation! | Type BO<br>Chart 200,7 |
| d170<br>Hardlock missing | Format generator output, hardlock block not available. The closed-loop shears control cannot be operated without this operating license! | Type BO<br>Chart 200,6 |
| d171<br>FGEN Error | Format generator, group error: Internal error or illegal characteristic type was selected. | Type BO<br>Chart 200,7 |
| H172<br>S. Format Change_3 | 3rd source to enable the format controller. Refer to H173.<br>Default: not used | Value 0000<br>Type I<br>Chart 200,2 |
| H173<br>S. Format Changed1 | 1st source to enable the format controller. The format controller is simultaneously signaled about a change in the format constants (AX, AY, AZ, format length). The connected signal must be a short duration pulse.<br>Default: Synchronizing pulse, knife encoder | Value 0413<br>Type I<br>Chart 200,2 |
| H174<br>S. Format Changed2 | 2nd source to enable the format controller. Refer to H173.<br>Default: Pulse at the start of positioning (linear axis) | Value 1345<br>Type I<br>Chart 200,2 |
| H175<br>S. FC_FormatSetp1 | 1st source for the format setpoint of the format controller.<br>Default: *Format setpoint* of the format request (normalized) | Value 3629<br>Type I<br>Chart 220,2 |

| Parameter | Description | Data |
|---|---|---|
| H176<br>S. FC_FormatSetp2 | 2nd source for the format setpoint of the format controller.<br>Default: *Long Format* (normalized) | Value 3098<br>Type I<br>Chart 220,2 |
| H177<br>S. FC FormatSel | Source to changeover the format setpoint for the format controller.<br>Default: *Special length selected* signal | Value 0575<br>Type I<br>Chart 220,2 |
| H178<br>S. FC actFormat | Source for the format actual value of the format controller.<br>Default: *SynchrPosition* material position when synchronizing the knife position encoder | Value 3436<br>Type I<br>Chart 220,2 |
| H179<br>Integral Time FC | Integrating time of the format controller (I controller) | Value 20 ms<br>Type SD<br>Chart 220,4 |
| H180<br>FC_max | Positive limit value of the format controller.<br>Default: Format controller not active. | Value 0.0<br>Type R<br>Chart 220,5 |
| H181<br>FC_min | Negative limit value of the format controller.<br>Default: Format controller not active. | Value 0.0<br>Type R<br>Chart 220,5 |
| H182<br>S. freeze_FC | Source for the signal to stop the format controller.<br>Default: *No cutting operation* signal | Value 0577<br>Type I<br>Chart 220,3 |
| d183<br>Output FC-Int | Output of the format current controller | Type R<br>Chart 220,6 |
| d184<br>Output FC | Format controller output. This signal represents a corrected format setpoint to be entered at the format generator. The correction is used to compensate cutting errors. | Type R<br>Chart 220,7 |
| H185<br>S. FC FormatSetp | Source for the format controller format setpoint.<br>Default: *Actual setpoint format* | Value 3414<br>Type I<br>Chart 220,2 |
| H186<br>S. FC FormatNorm | Source for the normalization factor to calculate the cut error.<br>Default: *Xref normalization* | Value 3114<br>Type I<br>Chart 220,2 |
| H187<br>S.V Cut curve | Source for the cutting velocity when processing the cutting curve. The cutting velocity is the deviation from the synchronous velocity while the knife is in the cutting range. The integral of this represents the angular error, which is obtained as a result of the cutting velocity.<br>Default: Output of the cutting curve. | Value 3577<br>Type I<br>Chart 265,1 |
| H188<br>S. Cutc_Int=0 | Source for the control signal to delete the integral over the cutting velocity. | Value 0413<br>Type I<br>Chart 265,1 |
| H189<br>Cut Curve_max | Upper limit of the integral over the cutting velocity.<br>Default: Cutting curve not active. | Value 0.0<br>Type R<br>Chart 265,3 |
| H190<br>Cut Curve_min | Lower limit of the integral over the cutting velocity.<br>Default: Cutting curve not active. | Value 0.0<br>Type R<br>Chart 265,3 |
| H191<br>S. Sample Cut | Source for the signal to save the cutting angular error (refer to H187).<br>Default: The value when exiting the cutting range is saved. | Value 0169<br>Type I<br>Chart 265,4 |
| H192<br>S. FC FormatSetp2 | Source for a correction value to calculate the cutting error. | Value 3000<br>Type I<br>Chart 220,2 |
| H193<br>T Int Cut Curve | Integrating time for the integration over the cutting curve. The integrating time is the cutting time at the reference velocity and synchronous length<br>H193 = Xref_norm / V_ref = H105 · H108 / H104; (observe the units!) | Value 600 ms<br>Type SD<br>Chart 265,2 |
| H194<br>S. Phi_cut_reduce | Source for the function which should weigh the angular error, determined from the cutting curve, as supplementary angle.<br>Default: Weighting with a knife angle-dependent function | Value 3159<br>Type I<br>Chart 265,5 |
| H195<br>S. FC actFormat_l2 | Source for a correction value to calculate the cutting error. | Value 3000<br>Type I<br>Chart 220,2 |

| Parameter | Description | Data |
|---|---|---|
| d196<br>Cutting Error | Cutting error in [mm]. This value is valid only, if the knife position and the reference position are known exactly for the cutting instant. Faults of the reference position sensing can not be corrected (e.g. slip of the measuring wheel) | Type R<br>Chart 220,3 |
| H197<br>S. RefPos Limit | Source for the position actual value for the format generator, if this value is to be limited (e.g. negative values are not permitted) | Value 3438<br>Chart 200,1 |
| H198<br>RefPos max | Upper limit value to limit the reference position (refer to H197). | Value 100000.0<br>Chart 200,2 |
| H199<br>RefPos min | Lower limit value to limit the reference position (refer to H197). | Value 0.0<br>Chart 200,2 |
| H200<br>S. EnFormatCtrl | Source for the signal to calculate the format controller. The format controller is processed once at a positive edge of the connected signal. | Value 0172<br>Type I<br>Chart 220,2 |
| H201<br>S. AX_Formatgen | Source for the angular constant AX for the format generator. | Value 3118<br>Type I<br>Chart 200,3 |
| H202<br>S. AY_Formatgen | Source for the angular constant AY for the format generator. | Value 3119<br>Type I<br>Chart 200,3 |
| H203<br>S. AZ_Formatgen | Source for the angular constant AZ (position of the transition point) for the format generator. | Value 3103<br>Type I<br>Chart 200,3 |
| H210<br>AI1 Scale Factor | Scaling factor for analog input 1 (setting, refer to d214). | Value 1.0<br>Type: R<br>Chart 90,4 |
| H211<br>AI1 Offset | Offset value for analog input 1 (setting, refer to d214). | Value 0.0<br>Type R<br>Chart 90,4 |
| H212<br>AI1 Time Constant | Smoothing time constant for analog input 1. | Value 25 ms<br>Type SD<br>Chart 90,5 |
| H213<br>S. Disable AI1 | Source for the control signal to set the analog input 1 to 0.0.<br>Default: The measured value is not set to 0.0 | Value 0<br>Type I<br>Chart 90,6 |
| d214<br>AI1 smoothed | Filtered measured value at analog input 1 (AI1). This analog input is sensed in time sector T3. The measured value is obtained as<br>d214 = Terminal voltage * scaling factor / 5 V + offset<br>d214 = Terminal voltage * H210 / 5 V + H211 | Type R<br>Chart 90,7 |
| H215<br>AI2 Scale Factor | Scaling factor for analog input 2 (setting, refer to d219). | Value 1.0<br>Type R<br>Chart 90,3 |
| H216<br>AI2 Offset | Offset value for analog input 2 (setting, refer to d219). | Value 0.0<br>Type R<br>Chart 90,4 |
| H217<br>AI2 Time Constant | Smoothing time constant for analog input 2. | Value 25 ms<br>Type SD<br>Chart 90,5 |
| H218<br>S. Disable AI2 | Source for the control signal to set the analog input 2 to 0.0.<br>Default: The measured value is not set to 0.0 | Value 0<br>Type I<br>Chart 90,6 |
| d219<br>AI2 smoothed | Filtered measured value at analog input 2 (AI2). This analog input is sensed in time sector T3. The measured value is obtained as<br>d219 = Terminal voltage * scaling factor / 5 V + offset<br>d215 = Terminal voltage * H215 / 5 V + H216 | Type R<br>Chart 90,7 |
| H220<br>S. Analog Output 1 | Source for quantity X, which is output at analog output 1. The voltage at terminal 97 is obtained as<br>V_terminal97 = 5 V · (X + H224) / H225 | Value 3412<br>Type I<br>Chart 95,1 |
| H221<br>S. Disable AO1 | Source for the control signal to set the analog output 1 to 0.0.<br>Default: The output is not set to 0.0 | Value 0<br>Type I<br>Chart 95,1 |

| Parameter | Description | Data |
|---|---|---|
| H222<br>AO1 Time Constant | Smoothing time constant for analog output 1. | Value 0 ms<br>Type SD<br>Chart 95,2 |
| d223<br>Analog Output 1 | Displays the output quantity for analog output 1. The output is realized in the fastest time sector (T1). | Type R<br>Chart 95,4 |
| H224<br>AO1 Offset | Offset value of analog output 1 | Value 0.0<br>Type R<br>Chart 95,4 |
| H225<br>AO1 Scale Factor | Scaling for analog output 1 | Value 1.0<br>Type R<br>Chart 95,5 |
| H226<br>S. Analog Output 2 | Source for quantity X, which is output at analog output 1. The voltage at terminal 98 is obtained as<br>V_terminal98 = 5 V · (X + H230) / H231 | Value 3414<br>Type I<br>Chart 95,1 |
| H227<br>S. Disable AO2 | Source for the control signal to set the analog output 2 to 0.0.<br>Default: The output is not set to 0.0 | Value 0<br>Type I<br>Chart 95,1 |
| H228<br>AO2 Time Constant | Smoothing time constant for analog output 2. | Value 0 ms<br>Type SD<br>Chart 95,2 |
| d229<br>Analog Output 2 | Displays the output quantity for analog output 2. The output is realized in the fastest time sector (T1). | Value R<br>Chart 95,4 |
| H230<br>AO2 Offset | Offset value of analog output 2 | Value 0.0<br>Type R<br>Chart 95,4 |
| H231<br>AO2 Scale Factor | Scaling for analog output 2 | Value 1.0<br>Type R<br>Chart 95,5 |
| H232<br>S.Norm. Fixed Pos. | Source for the normalization factor for 4 position fixed values. | Value 3100<br>Type<br>Chart 70,7 |
| H233 ... H236<br>Fixed pos. 1 ...<br>Fiexd pos. 4 | 4 fixed values interpreted as a position. These values are available as original and as normalized positions (nomalization factor see H233). | Value 0 mm<br>Type<br>Chart 70,6 |
| d241 ... d248<br>KL53 BinInput1 ...<br>KL60 BinInput8 | Actual signal level of digital inputs 1 to 8. (terminals 53 .. 60) | Type BO<br>Chart 110,3 |
| d249<br>KL84 Coarse Pulse 1 | Logic signal level at terminal 84. This input can be used as coarse pulse input for encoder1 (knife). | Type BO<br>Chart 110,7 |
| d250<br>KL65 Coarse Pulse 2 | Logic signal level at terminal 65. This input can be used as coarse pulse input for encoder2 (material). | Type BO<br>Chart 110,7 |
| d261<br>KL46 Input | Logic signal level at terminal 46 (bi-directional). If the associated output driver is activated (H265 = 1), the inverse signal level is read. | Type BO<br>Chart 100,3 |
| d262<br>KL47 Input | Logic signal level at terminal 47 (bi-directional). If the associated output driver is activated (H266 = 1), the inverse signal level is read. | Type BO<br>Chart 100,3 |
| d263<br>KL48 Input | Logic signal level at terminal 48 (bi-directional). If the associated output driver is activated (H267 = 1), the inverse signal level is read. | Type BO<br>Chart 100,7 |
| d264<br>KL49 Input | Logic signal level at terminal 49 (bi-directional). If the associated output driver is activated (H268 = 1), the inverse signal level is read. | Type BO<br>Chart 100,7 |
| H265<br>Enable BiDir1<br>*Initialization par.* | Defines the driver direction for the bi-directional digital terminal 46.<br>0: Input<br>1: Output | Value 1<br>Type BO<br>Chart 100,2 |
| H266<br>Enable BiDir2<br>*Initialization par.* | Defines the driver direction for the bi-directional digital terminal 47.<br>0: Input<br>1: Output | Value 1<br>Type BO<br>Chart 100,2 |
| H267<br>Enable BiDir3<br>*Initialization par.* | Defines the driver direction for the bi-directional digital terminal 48.<br>0: Input<br>1: Output | Value 1<br>Type BO<br>Chart 100,6 |

| Parameter | Description | Data |
|---|---|---|
| H268<br>Enable BiDir4<br>*Initialization par.* | Defines the driver direction for the bi-directional digital terminal 49.<br>0: Input<br>1: Output | Value 0<br>Type BO<br>Chart 100,6 |
| H269<br>S. Bin. Output 1 | Source of the digital signal for output at terminal 51.<br>Default: *Raise knife/saw*. | Value 1259<br>Type I<br>Chart 100,1 |
| H270<br>S. Bin. Output 2 | Source of the digital signal for output at terminal 52.<br>Default: *Lower knife/saw*. | Value 1279<br>Type I<br>Chart 100,1 |
| H271<br>S. BiDir Out 1 | Source of the digital signal for output at terminal 46.<br>Default: *Fault*. | Value 0014<br>Type I<br>Chart 100,1 |
| H272<br>S. BiDir Out 2 | Source of the digital signal for output at terminal 47.<br>Default: *Open brake*. | Value 0676<br>Type I<br>Chart 100,1 |
| H273<br>S. BiDir Out 3 | Source of the digital signal for output at terminal 48.<br>Default: *Fan control*. | Value 0978<br>Type I<br>Chart 100,5 |
| H274<br>S. BiDir Out 4 | Source of the digital signal for output at terminal 49. | Value 0<br>Type I<br>Chart 100,5 |
| H276<br>AI3 Scale Factor | Scaling factor SF for analog input 3 (setting, refer to d279). | Value 1.0<br>Type: R<br>Chart 90,3 |
| H277<br>AI3 Offset | Offset value for analog input 3 (setting, refer to d279). | Value 0.0<br>Type R<br>Chart 90,4 |
| H278<br>AI3 Time Constant | Smoothing time constant for analog input 3. | Value 100 ms<br>Type SD<br>Chart 90,5 |
| d279<br>AI3 smoothed | Actual measured value at analog input 3 (AI3). This analog input is sensed in time sector T4. The measured value is obtained as<br>d279 = Terminal voltage * scaling factor / 5 V + offset<br>d279 = Terminal voltage * H275 / 5 V + H276 | Type R<br>Chart 90,5 |
| H280<br>AI4 Scale Factor | Scaling factor SF for analog input 4 (setting, refer to d283). | Value 1.0<br>Type: R<br>Chart 90,3 |
| H281<br>AI4 Offset | Offset value for analog input 4 (setting, refer to d283). | Value 0.0<br>Type R<br>Chart 90,4 |
| H282<br>AI4 Time Constant | Smoothing time constant for analog input 4. | Value 100 ms<br>Type SD<br>Chart 90,5 |
| d283<br>AI4 smoothed | Actual measured value at analog input 4 (AI4). This analog input is sensed in time sector T4. The measured value is obtained as<br>d283 = Terminal voltage * scaling factor / 5 V + offset<br>d283 = Terminal voltage * H280 / 5 V + H281 | Type R<br>Chart 90,5 |
| H284<br>AI5 Scale Factor | Scaling factor SF for analog input 5 (setting, refer to d287). | Value 1.0<br>Type: R<br>Chart 90,3 |
| H285<br>AI5 Offset | Offset value for analog input 5 (setting, refer to d287). | Value 0.0<br>Type R<br>Chart 90,4 |
| H286<br>AI5 Time Constant | Smoothing time constant for analog input 5. | Value 100 ms<br>Type SD<br>Chart 90,5 |
| d287<br>AI5 smoothed | Actual measured value at analog input 5 (AI5). This analog input is sensed in time sector T4. The measured value is obtained as<br>d287 = Terminal voltage · scaling factor / 5 V + offset<br>d287 = Terminal voltage · H284 / 5 V + H285 | Type R<br>Chart 90,5 |

| Parameter | Description | Data |
|---|---|---|
| d301 ... d316<br>PZD1 from CU ...<br>PZD16 from CU | Process data received from the basic drive. The following are default values:<br>d301 PZD1 Status word 1<br>d302 PZD2 Speed actual value<br>d304 PZD4 Status word 2<br>d305 PZD5 Torque actual value<br>d307 PZD7 Current actual value | Type W<br>Chart 610,2 |
| H317<br>S. ActValue1 CU | 1st source to re-normalize a 16-bit process data in REAL (floating point). Default: *PZD2 from CU* | Value 2302<br>Type I<br>Chart 610,4 |
| H318<br>CU ActValue1 Norm | Normalization factor for the 1st actual value from the basic drive.<br>Calculation rule:<br>CU actual value1 = H318 · process data(16 bit) / 16768 | Value 1.0<br>Type R<br>Chart 610,6 |
| d319<br>CU Act Value 1 | 1st actual value from the basic drive converter as floating-point quantity | Type R<br>Chart 610,7 |
| H320<br>S. ActValue2 CU | 2nd source to re-normalize a 16-bit process data in REAL (floating point). Default: *PZD3 from CU* | Value 2303<br>Type I<br>Chart 610,4 |
| H321<br>CU ActValue2 Norm | Normalization factor for the 2nd actual value from the basic drive.<br>Calculation rule:<br>CU actual value2 = H321 · process data(16 bit) / 16768 | Value 1.0<br>Type R<br>Chart 610,6 |
| d322<br>CU ActValue2 | 2nd actual value from the basic drive as floating-point quantity | Type R<br>Chart 610,7 |
| H323<br>S. ActValue3 CU | 3rd source to re-normalize a 16-bit process data in REAL (floating point). Default: *PZD5 from CU* | Value 2305<br>Type I<br>Chart 610,4 |
| H324<br>CU ActValue3 Norm | Normalization factor for the 3rd actual value from the basic drive.<br>Calculation rule:<br>CU actual value1 = H324 · process data(16 bit) / 16768 | Value 1.0<br>Type R<br>Chart 610,6 |
| d325<br>CU AvtValue3 | 3rd actual value from the basic drive as floating-point quantity | Type R<br>Chart 610,7 |
| H326<br>S. ActValue4 CU | 4th source to re-normalize a 16-bit process data in REAL (floating point). Default: *PZD6 from CU* | Value 2306<br>Type I<br>Chart 610,4 |
| H327<br>CU ActValue4 Norm | Normalization factor for the 4th actual value from the basic drive.<br>Calculation rule:<br>CU actual value1 = H327 · process data(16 bit) / 16768 | Value 1.0<br>Type R<br>Chart 610,6 |
| d328<br>CU ActValue4 | 4th actual value from the basic drive converter as floating-point quantity | Type R<br>Chart 610,7 |
| H329<br>S. DW1 low CU | Source to re-normalize the low word of a 32-bit process data in REAL (floating point). Default: *PZD15 from CU* | Value 2315<br>Type I<br>Chart 610,4 |
| H330<br>S. DW1 high CU | Source to re-normalize the high word of a 32-bit process data REAL (floating point). Default: *PZD16 from CU* | Value 2316<br>Type I<br>Chart 610,4 |
| H333<br>CU DW1 Norm | Normalization factor for the 32-bit word from the basic drive.<br>Calculation rule:<br>CU actual value DW1 = H333 · process data(32 bit) / 1073741824 | Value 1.0<br>Type R<br>Chart 610,6 |
| d334<br>CU ActValue DW1 | 1st double word from the basic drive as floating-point quantity | Type R<br>Chart 610,7 |
| H335<br>S.Store Value 1 | Source for the first value which should be store in the permanent memory of the T400. (Factory setting: position of the rising edge of the coarse pulse) | Value 3414<br>Type I<br>Chart 170,6 |
| H336, H337<br>S.EnStoreVal_1A,<br>S.EnStoreVal_1B | Source for 2 conditions for the storing of H335 (AND gate). | Type I<br>Chart 170,6 |
| H338<br>S.Store Value 2 | Source for the first value which should be store in the permanent memory of the T400. (Factory setting: position of the rising edge of the coarse pulse) | Value 3414<br>Type I<br>Chart 170,6 |

| Parameter | Description | Data |
|---|---|---|
| H339, H340<br>S.EnStoreVal_2A,<br>S.EnStoreVal_2B | Source for 2 conditions for the storing of H338 (AND gate). | Type I<br>Chart 170,6 |
| H356<br>S. Status word 1 CU | Source for status word 1 from the basic drive. This connection should remain connected to the first process data, which is received from the basic drive. | Value 2301<br>Type I<br>Chart 620,1 |
| d357<br>Status word 1 CU | Status word 1 from the basic drive. | Type W<br>Chart 620,1 |
| H358<br>S. Status word 2 CU | Source for status word 2 from the basic drive. This connection is connected, as standard, to the 4th process data, which is received from the basic drive. | Value 2304<br>Type I<br>Chart 620,5 |
| d359<br>Status word 2 CU | Status word 2 from the basic drive. | Type W<br>Chart 620,5 |
| H360 ... H362<br>S. En Synchr Ref1 ...<br>S. En Synchr Ref3 | 3 sources of the AND logic gate to enable the position-dependent pass mark synchronization. | Type I<br>Chart 140,7 |
| H363, H364<br>S. Enable Mark_1 ...<br>S. Enable Mark_2 | 2 sources of the OR logic gate to enable the position-dependent pass mark synchronization outside the enable window (e.g.: to recognize the first mark). | Type I<br>Chart 140,5 |
| H366<br>Window Passmark | Possible deviation of the pass mark position from the reference position (information/data referred to Fsymech) to define a synchronizing window. | Value 0.05<br>Type R<br>Chart 140,1 |
| H367, H368<br>S. RefPos modulo<br>S. Format modulo | Two sources for a modulo division. The result may be used to display the reference position within format length. | Type I<br>Chart 135,6 |
| H369<br>S. XrefCorrection | Source for an optional signal to trigger the correction function for the reference position. | Value 0000<br>Type I<br>Chart 130,1 |
| H370<br>S. ReqManualCut | Source for the binary manual cutting request. | Value 0000<br>Type I<br>Chart 145,2 |
| H371<br>S.EnablManualCut | Source for the binary enable for manual cutting. Recommendation: Set to 666 if the shear may perform a manual cut while the web is standing still. | Value 0000<br>Type I<br>Chart 145,2 |
| H372<br>S.start of cut | Source for a binary value which signals the start of the cutting procedure. After the start of cut is detected the manual cut pulse is reset. | Value 0000<br>Type I<br>Chart 145,2 |
| H373<br>S.end of cut | Source for a binary value which signals the end of the cutting procedure. After the end of cut is detected the next manual cut may be initiated | Value 0000<br>Type I<br>Chart 145,2 |
| H374<br>S. RefCorrPulse | Source for a binary value which signals the correction of the reference position after cutting. This information is required to calculate the correction value for the reference position. Set to 413 if the reference position is reseted by the zero pulse of the shear. | Value 0424<br>Type I<br>Chart 145,2 |
| H375<br>Tmax manual cut | Time limitation for the manual cutting operation. The manual cutting is aborted if there was no end of cut detected within the time interval specified by H375. | Value 5000 ms<br>Type SD<br>Chart 145,4 |
| H400<br>Pulse Encoder 1<br>*Initialization par.* | Number of pulses per revolution of the incremental encoder for the knife position sensing | Value 1024<br>Type I<br>Chart 120,3 |
| H401<br>S. Refer. Speed_1 | Source for the knife reference speed. As standard, the reference speed is automatically calculated from the system parameters (refer to Chart 80). The reference speed is the speed at which the material runs with the reference velocity and the synchronous format length is cut. | Value 3401<br>Type I<br>Chart 120,4 |
| H402<br>S. Ref. Pulses_1 | Source for the reference pulse number of the knife. This is the number of edge changes (quadrupled pulses) of the incremental tracks, when the knife is moved through Fsymech. The reference pulse number is automatically, calculated as standard from the plant/system parameters (refer to Chart 80). | Value 5402<br>Type I<br>Chart 120,3 |
| H403<br>S. Reset Pos_1 | Source for the signal to reset the knife position. | Value 1311<br>Type I<br>Chart 120,3 |

| Parameter | Description | Data |
|---|---|---|
| H404<br>S. Set Pos_1 | Source for the signal to set the knife position. | Value 1306<br>Type I<br>Chart 120,3 |
| H405<br>S. Sync1 Enable | Source for the signal to enable the knife position synchronization | Value 0317<br>Type I<br>Chart 120,3 |
| H406<br>S. Pos. Set Value_1 | Source for the position setting value of the knife position. | Value 3313<br>Type I<br>Chart 120,3 |
| H407<br>Mode Encoder 1<br><br>*Initialization par.* | Operating mode of the knife speed sensing<br><br>The operating mode of the speed sensing block for the knife drive is set using this parameter; this especially involves the digital filter, the encoder type, the coarse signal type selection and the source of the encoder pulses.<br><br>The selected operating mode is highlighted (bold). For additional information, refer to the SIMADYN D Reference Manual, function block library, function block NAVS, connection MOD.<br><br>- - - X: Last hexadecimal location = 2 means:<br><br>Bit 0<br><br>**0 Encoder 1:** Two pulse tracks, offset through 90°<br>1 Encoder 2: A dedicated track for each direction of rotation<br><br>Bit 3..1 Digital filter with time constant /limiting frequency 500 ns / 2 MHz<br>000x No filter<br><br>**001x 500 ns (encoder 1)** 125 ns (encoder 2)<br>010x 2 µs (encoder 1) illegal (encoder 2)<br>011x 8 µs (encoder 1) illegal (encoder 2)<br>100x 16 µs (encoder 1) illegal (encoder 2)<br>Rest illegal<br><br>- - X - Last but one location = E means:<br><br>Bit 4 Setting mode for input S<br><br>**0 Set YP to SV**<br>1 Subtract SV from YP<br><br>Bit 5 Setting mode for input SP<br><br>**0 Set YDP to SVD**<br>1 Subtract SVD from YDP<br><br>Bit 6 Source of the encoder tracks (can only be selected for terminal XE1)<br><br>0 From terminal XE1 of the T400<br>**1 From the BASEBOARD**<br><br>Bit 7 Source of the zero pulse (can only be selected for terminal XE1)<br><br>0 From terminal XE1 of T400<br>**1 From the BASEBOARD**<br><br>XX - -: The two most significant locations = 7F means:<br><br>The standstill limit is corrected for 127 sampling cycles | Value 16#7FC2<br>Type: W<br>Chart 120,3 |

| Parameter | Description | Data |
|---|---|---|
| H408<br>SyncMode Encod_1<br><br>*Initialization par.* | Setting the synchronization type of the knife speed sensing. The value has several functions. The values in **bold** represent the factory setting.<br><br>Bit(s) / Value / Significance<br>0 / **0** / **Synchronizing via the zero pulse**<br>1 / Synchronizing via the trigger input (not for T400)<br>1 / **0** / **When synchronizing, the pos. is set to the setting value**<br>1 / When synchronizing, the setting value is subtracted from the position<br>2 / 0 / Direction of rotation-dependent evaluation of the synchronizing signal<br>1 / Synchronizing with the leading edge of the synchronous pulse (H428 bit 2 and H408 bit2 **must be identical**)<br>3 / Not assigned<br>6...4 / XYZ / Number of the coarse pulse version (refer to Fig. 3-7)<br>011 / e. g.: No. 3 (mode 3; zero pulse is always available if the coarse- and fine pulse have a high signal level)<br>15...7 / Not evaluated | Value 0<br>Type W<br>Chart 120,3 |
| H409<br>Max. Pulse Enc_1 | Automatic position overflow generation. For more than H409 pulse edges (4x pulses) in one direction of rotation, the knife position is reduced by the value H409 / reference pulses and the *Maximum position exceeded* output is set to '1' for a processing cycle.<br><br>The function is enabled for H409 > 0. | Value 0<br>Type DI<br>Chart 120,4 |
| d410<br>Error Encoder 1 | Group error message of the knife speed sensing. When a fault develops (d410 = '1') evaluate d410. | Type BO<br>Chart 120,6 |
| d411<br>Speed Shear | Normalized and smoothed (H417) knife speed. The speed value 1.0 is obtained if the material web is running with the reference speed and a synchronous format length is cut. | Type R<br>Chart 120,7 |
| d412<br>Error code Enc 1 | Error code of the knife drive speed sensing. In operation, the value must be 0. If it is not equal to 0, there is an error in the parameterization of the speed sensing.<br><br>The cases identified by *) can only occur after user-specific changes in the configured software.<br><br>Significance of the error bits:<br><br>0 Parameters may not be 0: H400, H104, H105, H108, H118<br>1 Sampling time > 20 ms *)<br>2 H407, illegal filter parameterization<br>3 Slave without master *)<br>4 Master and slave in various sampling times *)<br>5 Several masters use the same encoder *)<br>6 Master and slave use the same encoder *)<br>7 Pulse counter overflow | Type W<br>Chart 120,6 |
| d413<br>Pos. Shear | Knife position normalized as defined in H100 (e. g. in angular degrees or [mm]. The value is displayed without name, as the names cannot be changed by the user. | Type R<br>Chart 120,7 |
| H414<br>S. Pos. SyncPulse | Source for the synchronizing pulses of the knife position generated per software. It can involve the following: *Synchronized position* or *Maximum position exceeded.* | Value 0413<br>Type I<br>Chart 120,6 |
| H415<br>S. En Pos_2 Corr | Source for the signal to enable the correction function for the reference position. | Value 0576<br>Type I<br>Chart 130,1 |
| H416<br>Pos SyncDelay | Cutting pulse extension, which means that synchronizing pulses can be identified in slower processing cycles. | Value 100 ms<br>Type SD<br>Chart 120,7 |
| H417<br>Tfilt n Shear | Filter time constant to smooth the knife speed actual value. | Value 20 ms<br>Type SD<br>Chart 120,6 |
| H418<br>T_Long Pulse | Duration of the extended pulse. | Value 32 ms<br>Type SD<br>Chart 130,8 |
| H419<br>S. Long Pulse | Source for the extended pulse. This is used to transfer synchronizing pulses for slower processing cycles. | Value 0431<br>Type I<br>Chart 130,7 |

| Parameter | Description | Data |
|---|---|---|
| H420<br>Pulse Encoder 2<br>*Initialization par.* | Number of pulses per revolution of the incremental encoder for material position sensing. | Value 1024<br>Type I<br>Chart 130,2 |
| H421<br>S. Refer.Speed_ 2 | Source for the material reference speed. The reference speed is automatically calculated from the plant/system parameters as standard (refer to Chart 80). The speed of the material sensing where the material is running with the reference speed is the reference speed. | Value 3421<br>Type I<br>Chart 130,3 |
| H422<br>S. Refer.pulses_ 2 | Source for the reference pulse number of the material sensing. This is the number of edge changes (quadrupled pulses) of the incremental tracks, if the material is moved forwards by the synchronous format. The reference pulse number is automatically calculated from the plant/system parameters as standard (refer to Chart 80). | Value 5422<br>Type I<br>Chart 130,3 |
| H423<br>S. set Pos_2 | Source for the signal to set the material position. | Value 0208<br>Type I<br>Chart 130,3 |
| H424<br>S. Pos_2 correct | Source for the signal to correct the material position. For a positive edge at the *Correct signal* input, the *Position correction value* is subtracted from the actual material position. | Value 1345<br>Type I<br>Chart 130,1 |
| H425<br>S. Enable Synchr2 | Source for the signal to enable material position synchronization. | Value 0317<br>Type I<br>Chart 130,2 |
| H426<br>S. Pos.Set Value2 | Source for the position setting value of the material position. | Value 3204<br>Type I<br>Chart 130,3 |
| H427<br>S. Pos.corr.Val2 | Source for the position correction value of the material position. For a positive edge at the *Correct position* input, the position correction value is subtracted from the actual position. | Value 3630<br>Type I<br>Chart 130,2 |
| H428<br>SyncMode Encoder2<br>*Initialization par.* | Setting for the synchronization type of the material-speed sensing.<br>Settings, refer to H408. | Value 0<br>Type W<br>Chart 130,3 |
| H429<br>Mode Encoder2<br>*Initialization par.* | Setting of the material-speed sensing mode.<br>Settings, refer to H407. | Value 16#7F02<br>Type W<br>Chart 130,2 |
| H430<br>MaxPulseEnc_2 | Automatic position overflow generation. For more than H430 pulse edges (4x pulses) in one direction of rotation, the material position is reduced by the value H430 / reference pulses, and the *Maximum position exceeded* output is set to ‘1’ for one processing cycle.<br>The function is enabled by H430 > 0. | Value 0<br>Type DI<br>Chart 135,1 |
| H431<br>S. Ref_Mark_Pos | Source for the pass mark position. This position is used as setpoint for the offset correction. | Value 3094<br>Type I<br>Chart 135,1 |
| H432<br>S. FreezeCorrect. | Source to interrupt the offset correction. As long as the connected signal = ‘1’, correction is stopped. If the signal goes to ‘0’, correction is continued until the position and corrected position are identical. | Value 0453<br>Type I<br>Chart 135,1 |
| d433<br>Error Encoder2 | Group error message of the material-speed sensing. If a error develops (d433 = ‘1’), evaluate d433. | Type BO<br>Chart 130,5 |
| d434<br>Error code Enc2 | Error code of the speed sensing of the material feed. In operation, the value must be 0. If it is not equal to 0, then there is an error in the speed sensing parameterization. Error bits, refer to d412. | Type W<br>Chart 130,5 |
| d435<br>Speed 2 | Material velocity, normalized and smoothed to V_reference (H436). | Type R<br>Chart 130,6 |
| H436<br>Tfilt Speed 2 | Filter time constant to smooth the material velocity actual value. | Value 4.8 ms<br>Type SD<br>Chart 130,5 |
| d437<br>Position 2 | Normalized material position after the offset correction. If a material position offset has been identified, the material position is instantaneously set to the correct value. The *Position2* value doesn’t immediately follow this step function, but approaches the actual position value in smaller steps. | Type R<br>Chart 135,3 |
| d438<br>Reference Pos | The reference position is the normalized material position, which is used as reference for the knife position closed-loop control. This involves the actual material position, multiplied by the overspeed factor. | Type R<br>Chart 135,4 |

| Parameter | Description | Data |
|---|---|---|
| H439<br>S. Ref Pos Factor | Source for the factor to calculate the reference position from the material position. This is connected as standard with factor 1.0. | Value 3001<br>Type I<br>Chart 135,3 |
| H440<br>S. Ref. Pos. Offset | Source of the offset value for shifting the coordinate origin of the reference position (particularly for the format generator). Set to 3000 for systems with rotary axis. | Value 3001<br>Type<br>Chart 135,3 |
| H441<br>S. act Form_Norm | Source for the required normalization of the measured actual format. | Value 3114<br>Type I<br>Chart 130,5 |
| d442<br>Reference Error | Error message from the material position monitoring. An error occurs, if the material position falls below the minimum value H443. | Type BO<br>Chart 135,7 |
| H443<br>Reference Min | Lowest permissible material position in operation. When the limit value is fallen below, d442 is set to '1'. | Value -0.5<br>Type R<br>Chart 135,6 |
| H444<br>Correct. Increm. | If a material position offset has been identified, the offset error is corrected in small steps. The actual material position deviates from the reference position relevant for the control (d437) during this correction phase. However, this deviation is reduced by the value of H444 at each processing until both of the values are identical. | Value 0.02 %<br>Type R<br>Chart 135,3 |
| d445<br>Material Position | Material position in [mm] | Type R<br>Unit mm<br>Chart 135,5 |
| H446<br>ResetDisplCorr. | Inhibiting the offset correction. | Value 1<br>Type BO<br>Chart 135,2 |
| d447<br>Actual Format | Measured cut length. This value is only valid when the material position is synchronized with the zero pulse of the knife encoder. | Type R<br>Chart 130,6 |
| H448<br>S. Set First Mark | Source to activate the status W*ait for first pass mark*. | Value 0434<br>Type I<br>Chart 135,1 |
| H449<br>S. Reset First Mark | Source to de-active the status *Wait for first pass mark*. | Value 0577<br>Type I<br>Chart 135, 1 |
| H450<br>S. Range Test | Source for the knife position actual value for the range monitoring of the knife position. The purpose of this monitoring function is to check whether the knife is in the cutting- or in the format range. | Value 3413<br>Type I<br>Chart 330,1 |
| H451<br>S. Range Test Start | Source for the start of the format range for the knife range monitoring. | Value 3091<br>Type I<br>Chart 330,1 |
| H452<br>S. Range Test End | Source for the end of the format range for the knife range monitoring. | Value 3092<br>Type I<br>Chart 330,1 |
| d453<br>in SynchrRange | Range of the actual knife position:<br>0: In the format range<br>1: In the synchronous range | Type BO<br>Chart 330,4 |
| H454<br>S. EnableVrefSim. | Source of the signal to enable simulation operation for the reference position sensing. **NOTE**: Track A,B and zero pulse of the encoder input are ignored if simulation is active! | Value 0<br>Type I<br>Chart 130,3 |
| H455<br>S. vRef simul. | Source for the simulated reference speed. Normalization: 1.0 = reference speed. Factory setting: Connected to analog input 2 (AI2). | Value 3219<br>Type I<br>Chart 130,2 |
| H456<br>S. n Standstill | Source for the speed signal for standstill identification | Value 3411<br>Type I<br>Chart 330,1 |
| H457<br>Limit n_zero | Speed actual value below which knife standstill is signaled. | Value 0.002<br>Type R<br>Chart 330,2 |
| H458<br>Hyst n_zero | Speed hysteresis to identify that the knife is at a standstill. | Value 0.001<br>Type R<br>Chart 330,2 |
| d459<br>n_shear > 0 | Display: Shears are moving | Type BO<br>Chart 330,3 |

| Parameter | Description | Data |
|---|---|---|
| d460<br>n_shear Zero | Display: Shears are stationary | Type BO<br>Chart 330,3 |
| H461<br>S. ActPos_KCPos | Source for the actual knife position to check whether the shears are at the knife change position. | Value 3413<br>Type I<br>Chart 330,5 |
| H462<br>KCPos_Range | Permissible deviation from the knife change position. | Value 2.0<br>Type R<br>Chart 330,6 |
| H463<br>KCPos_Hyst | Hysteresis when checking whether the knife is at the knife change position. | Value 1.0<br>Type R<br>Chart 330,7 |
| d464<br>in Knife Change Pos | Display: The knife is at the knife change position. | Type BO<br>Chart 330,7 |
| H465<br>S. Mark Puls Up | Source for the counting pulse of the pass mark counter | Value 0420<br>Type I<br>Chart 135,5 |
| H466<br>S. Mark Puls Down | Source for the down counting pulse of the pass mark counter | Value 0000<br>Type I<br>Chart 135,5 |
| H467<br>S. Mark Cnt Reset | Source to delete the pass mark counter. | Value 0434<br>Type I<br>Chart 135,5 |
| H468<br>S. Mark Cnt Set | Source to set the pass mark counter (setting value, refer to H469). | Value 0000<br>Type I<br>Chart 135,5 |
| H469<br>S. Mark Cnt SV | Source for the setting value of the pass mark counter. | Value 2000<br>Type I<br>Chart 135,5 |
| H470<br>S. Mark Cnt LU | Source for the upper limit of the pass mark counter. | Value 2586<br>Type I<br>Chart 135,5 |
| H471<br>S. Mark Cnt LL | Source for the lower limit of the pass mark counter. | Value 2000<br>Type I<br>Chart 135,5 |
| H472<br>S. Setp_KCPos | Source for the setpoint of the knife position to check whether the shears are in the knife change position. | Value 3109<br>Type I<br>Chart 330,5 |
| H473<br>PosRG_Diag_Sel | Activates a diagnostics function for the positioning block.<br>Only for internal use! | Value 0<br>Type I<br>Chart 230,7 |
| d474<br>Vsetp PosRG | Output of the positioning unit: Reference (setpoint) speed for the knife (normalized) | Type R<br>Chart 230,7 |
| H475<br>S. PosRG Target1 | Source for the 1st target position for positioning (this is connected to the start position of the shears as standard) | Value 3161<br>Type I<br>Chart 230,1 |
| H476<br>S. PosRG Target2 | Source for the 2nd target position for positioning (alternative goal) | Value 3000<br>Type I<br>Chart 230,1 |
| H477<br>S. PosRG TargetSel | Source for the control signal to select between 1st and 2nd target position:<br>0: Target 1<br>1: Target 2 | Value 0000<br>Type I<br>Chart 230,1 |
| H478<br>Rounding-Off | Rounding-off the speed for a positioning operation with the exception of the end range (refer to DA1 in Fig.4-17). The value presents the acceleration change, and is obtained as the 2nd derivative of the motor frequency. | Value 500.0<br>Type R<br>Chart 230,4 |
| H479<br>Final Rounding Off | Rounding-off the speed when positioning for the end range up to standstill (refer to DA2 in Fig.4-17). The value represents the acceleration change, and is obtained as the 2nd derivative of the motor frequency. | Value 100.0<br>Type R<br>Chart 230,4 |
| H480<br>PosRG_Vmax | Maximum mechanical motor frequency for positioning. If speed normalization is used ≠ 1.0, then the following must be valid:<br>PosRG_Vmax = max. motor frequency[Hz] / speed normalization | Value 1.0<br>Type R<br>Chart 230,7 |

| Parameter | Description | Data |
|---|---|---|
| H481<br>PosRG_Amax | Maximum mechanical motor acceleration in [1/s²] | Value 150.0<br>Type R<br>Chart 230,3 |
| H482<br>S. PosRG_Xnorm | Source for the position normalization for the positioning block. The position normalization is valid for the starting- and target position and for the calculated reference position when positioning. Positioning requires the position in units [revolutions]. Thus, the following is valid for the normalization:<br>Position normalization = position in [revolutions] / position(normalized) | Value 3050<br>Type I<br>Chart 230,1 |
| H483<br>S. PosRG_Vnorm | Source for the speed normalization for the positioning block. The speed normalization is valid for the initial- and maximum speed and for the calculated reference speed when positioning. Positioning requires the speed in units [revolutions/s]. Thus, the following is valid for the normalization:<br>Speed normalization = speed in [revolutions/s] / speed (normalized) | Value 3400<br>Type I<br>Chart 230,1 |
| H484<br>S. PosRG Startpos | Source of the starting position for positioning (= actual knife position) in the normalization selected with H482. | Value 3414<br>Type I<br>Chart 230,1 |
| H485<br>S. PosRG VStart | Source of the initial speed (velocity) for positioning (= actual knife speed) in the normalization selected with H483. | Value 3412<br>Type I<br>Chart 230,1 |
| H486<br>S. PosRG_set | Source for the “Accept setting value when positioning“ function (this involves the starting position, starting speed). As long as the start values are accepted, they are passed on to the positioning which outputs them as reference values. If the setpoint transfer takes several processing cycles, the acceleration is also determined from the speed change. Positioning starts as soon as the setting function becomes inactive (‘0’). | Value 1346<br>Type I<br>Chart 230,1 |
| H487<br>KP PosRG | Proportional gain for the position controller of the positioning function. | Value 1.0<br>Type R<br>Chart 230,3 |
| H488<br>Tn PosRG | Integral action time for the position controller of the positioning function. | Value 0.0 ms<br>Type SD<br>Unit ms<br>Chart 230,3 |
| H489<br>S. PosRG_actPos | Source for the actual position for the positioning function. | Value 3414<br>Type I<br>Chart 230,1 |
| H490<br>S. PosRG_PI enabl | Source to enable the position controller when positioning. | Value 1347<br>Type I<br>Chart 230,1 |
| H491<br>S. PosRG_clear_I | Source to delete the integral component of the position controller when positioning. | Value 0<br>Type I<br>Chart 230,1 |
| H492<br>S. PosRG_freeze_I | Source to hold the integral component of the position controller when positioning. | Value 0001<br>Type I<br>Chart 230,1 |
| H493<br>Tfilt_X_PosRG | Smoothing time constant for the knife drive speed setpoint. | Value 4.8 ms<br>Type SD<br>Unit ms<br>Chart 230,5 |
| H494<br>S. PosRG_PosSetp | Source of the setpoint of the position controller for the positioning. | Value 3486<br>Type BO<br>Chart 230,1 |
| H495<br>S. PosRG_Vmax | Source of the maximum speed for the positioning. | Value 3480<br>Type<br>Chart 230,1 |
| H496<br>PosRG_VLimit | Limit value for the position controller output when positioning. (this corresponds to the maximum, normalized knife speed). | Value 1.2<br>Type R<br>Chart 230,6 |
| H497<br>PosRG Acc_norm | Normalization factor to convert the acceleration setpoint (in 1/s²) into the normalized torque input for the drive converter (torque setpoint). The effective moment of inertia $J_{tot}$ and the reference torque $M_{ref}$ must be taken into account.<br>PosRG Acc_Norm = $1000 \cdot 2\pi \cdot J_{tot} / M_{ref}$ | Value 0.0<br>Type R<br>Chart 230,6 |

| Parameter | Description | Data |
|---|---|---|
| H498<br>S. PosRG_VSetp | Source for the precontrol of the position controller for positioning. In factory setting connected to the speed setpoint output of the ramp generator. | Value 3485<br>Type<br>Chart 230,4 |
| d499<br>PosRG aktiv | Status of the positioning setpoint generator:<br>0: Positioning inactive or completed<br>1: Positioning being processed | Type BO<br>Chart 230,5 |
| H500 ... H515<br>S. ShearCTW1 Bit0 ...<br>S. ShearCTW1Bit15 | Sources for the bits of the shears control word 1st assignment, refer to d536.<br>In the factory setting, all of the bits of the control word are connected with the 10th process data from COMBOARD. | Value s. Chart 270<br>Type I<br>Chart 270,1 |
| H516<br>Mask 1 LokMode | Mask to select the bits of the shears control word 1, which the automation uses in the *Manual* mode (refer to H518). | Value 16#FFFF<br>Type W<br>Chart 270,1 |
| H517<br>Mask 1 AutoMode | Mask to select the bits of the shears control word 1, which the automation uses in the *Automatic* mode (refer to H518). | Value 16#FFFF<br>Type W<br>Chart 270,1 |
| H518<br>Manual mode | Toggles between *Automatic* and *Manual*. When changing-over to *Manual*, for special activities, the functional scope may be restricted (e. g. for commissioning/start-up). | Value 0<br>Type BO<br>Chart 270,2 |
| H519<br>Simulation | Changes-over to the simulation mode. For the simulation mode, another source is selected for the shears control word 1 (e. g. fixed values). This means that, for example, modes can be tested without the automation system. | Value 0<br>Type BO<br>Chart 270,5 |
| H520 ... H535<br>S. ShearCTW2 Bit0 ...<br>S. ShearCTW2 Bit15 | Sources for the bits of shears control word 2. Assignment, refer to d544. | Value s. Chart 280<br>Type I<br>Chart 270,1 |
| d536<br>Shear-CTW1 | Shears control word 1 (essentially specifying the mode)<br>Bit0 Not used<br>Bit1 Continuous cut<br>Bit2 Sample cut<br>Bit3 Single cut<br>Bit4 Format setpoint valid<br>Bit5 Light barrier, start of the material web (for slow time sectors)<br>Bit6 Calibration mode<br>Bit7 Not used<br>Bit8 Approach the starting position<br>Bit9 Not used<br>Bit10 Enable cut program<br>Bit11 Crop cut<br>Bit12 End cut<br>Bit13 Not used<br>Bit14 Approach knife change position<br>Bit15 Option, special sample | Type W<br>Chart 270,5 |
| H537<br>S. SCTW1_simul | Source for the simulation value for shears control word 1. | Value 2621<br>Type I<br>Chart 270,4 |
| d539<br>SCTW1_PLC | Shears control word 1 from the automation. Assignment, refer to d536. | Type W<br>Chart 270,4 |
| H540<br>Mask2 LocMode | Mask to select the bits of control word 2, which the automation uses in the *Manual* mode (refer to H518). | Value 16#FFFF<br>Type W<br>Chart 280,1 |
| H541<br>Mask2 AutoMode | Mask to select the bits of control word 2, which the automation uses in the *Automatic* mode (refer to H518). | Value 16#FFFF<br>Type W<br>Chart 280,1 |
| H542<br>S. SCTW2_simul | Source for the simulation value for shears control word 2. | Value 2623<br>Type I<br>Chart 280,4 |
| d543<br>SCTW2_PLC | Shears control word 2 from the automation. Assignment, refer to d544. | Type W<br>Chart 280,4 |

| Parameter | Description | Data |
|---|---|---|
| d544<br>Shear-CTW2 | Shears control word 2<br>Bit0 Not used<br>Bit1 External fault/alarm 1<br>Bit2 External fault/alarm 2<br>Bit3 Jogging 1<br>Bit4 Jogging 2<br>Bit5 Not used<br>Bit6 Not used<br>Bit7 No fast stop<br>Bit8 Not used<br>Bit9 Coarse reference<br>Bit10 Not used<br>Bit11 Not used<br>Bit12 Enable cutting operation<br>Bit13 Not used<br>Bit14 Not used<br>Bit15 Acknowledge fault | Type W<br>Chart 280,6 |
| H547 ... H555<br>S. Shear Status B7 ...<br>S. Shear Status B 15 | Sources for the freely-definable bits of the shears status word (refer to d017) | Type I<br>Chart 520,1 |
| H560<br>S. Number Of Sheets | Source for the number of sheets to be cut for the cutting program (permissible range: 0 ... 32767). | Value 2809<br>Type I<br>Chart 300,2 |
| d561<br>Req. Cut Prog1 | Status of the request for continuous cutting from the cutting program.<br>'1' request available. | Type BO<br>Chart 300,4 |
| d562<br>End Cut Prog1 | Status, cutting program 1 completed.<br>'1' cutting program completed. | Type BO<br>Chart 300,5 |
| d563<br>Special sheet | At the last cut of a cutting program, this is used to display as to whether it involves a sheet with a different format. This control signal selects the format source for the format reference (Chart 190, 3).<br>'1' the last sheet is cut and a request for a special sample is present. | Type BO<br>Chart 300,5 |
| H564<br>S. Stop Cutting | Source for an optional control signal to exit the continuous cutting mode. This mode is self-latching, i. e., after the cut request has been withdrawn, a cut is still made. This characteristic can be bypassed using the signal at H564. | Value 0560<br>Type I<br>Chart 300,3 |
| d565<br>OM cont. Cut | Status: Operating mode, continuous cut is active. | Type BO<br>Chart 300,6 |
| H566, H567<br>S. AND_CutStop_1<br>S. AND_CutStop_2 | Sources of the AND logic gate to immediately stop continuous cutting. | Type I<br>Chart 300,1 |
| d568<br>OM Single Cut | Status: Single cutting mode is active. | Type BO<br>Chart 310,5 |
| d570<br>OM Test Cut | Status: Sample cut mode is active. | Type BO<br>Chart 310,5 |
| H572<br>S. Light OM EndCut | Source of the signal which should be used as the material detection for the operation mode "end cut". | Value 0555<br>Type I<br>Chart 260,3 |
| d573<br>OM End Cut | Status: End cut mode is active. | Type BO<br>Chart 320,7 |
| H574<br>S. Cut Pulse Delay | Source of the signal which should be used as the cutting pulse for the cut counting and cut fault error statistics. The pulse is extended to 32 ms, so that it can be used in a slower sampling time. | Value 0168<br>Type I<br>Chart 520,2 |
| d575<br>Special Sheet Size | Status: Cutting with a special length. This control signal is used to select the format source for the format controller. The first cut when cutting continuously is realized with a special length, in order to synchronize the shears to the material, starting from standstill. | Type BO<br>Chart 300,7 |
| d576<br>Cutting active | Status: One of the following modes is active: *Continuous cutting*, *single cut*, *sample cut* or *end cut*. | Type BO<br>Chart 320,4 |
| H577<br>Counter Reset | This is used to delete the cut counter status per parameter. | Value 0<br>Type BO<br>Chart 520,7 |

| Parameter | Description | Data |
|---|---|---|
| H578<br>S. Counter Set | Source for the signal to delete the cut counter (set to 0). | Value 0<br>Type I<br>Chart 520,5 |
| H579<br>S. Cut Pulses | Source for the pulses to increment the cut counter (cut pulses). | Value 0554<br>Type I<br>Chart 520,5 |
| H580<br>S. AcknEndofFault | Source for the steady-state signal with the “Fault“ significance. The ‘1’ ⇒ ’0’ edge of the signal generates a pulse (refer to H584 for the duration) to acknowledge the fault. In the factory setting, it is connected to the “Fault bit“ of status word 1 of the basic drive. | Value 0343<br>Type I<br>Chart 530,4 |
| H581<br>S. Acknowledge_1 | 1st source for a pulse to acknowledge a fault. | Value 0000<br>Type I<br>Chart 530,4 |
| H582<br>S. Acknowledge_2 | 2nd source for a pulse to acknowledge a fault. In the factory setting, this is connected to bit 7 of control word 1 of COMBOARD. | Value 0847<br>Type I<br>Chart 530,4 |
| H583<br>Delay End of Error | Length of an automatically generated acknowledgement pulse (refer to H580). | Value 10 s<br>Type SD<br>Chart 530,5 |
| d584<br>Acknowledge | Status of the signal to acknowledge a fault message. | Type BO<br>Chart 530,6 |
| H585<br>S. Mark Quantity 1 | Source for the number of pass marks before the first cut. | Value 2001<br>Type I<br>Chart 135,1 |
| H586<br>S. Mark Quantity 2 | Source for the number of pass marks between two cuts. | Value 2588<br>Type I<br>Chart 135,1 |
| H587<br>S. Mark Select | Source for the signal to select the pass mark number. | Value 0448<br>Type I<br>Chart 135,1 |
| H588<br>S. PM Format | Source for the cut format to calculate the pass marks between two cuts. | Value 3630<br>Type I<br>Chart 135,1 |
| H589<br>S. PM_dX_Mark | Source for the clearance of the pass marks (normalized). | Value 3592<br>Type I<br>Chart 135,1 |
| H590<br>S. Enable Prio1 | Source of the signal to enable the operating modes. The signal enables the priority logic for local- and cutting operating modes. | Value 0666<br>Type I<br>Chart 290,1 |
| d591<br>Request Local1 | One of the following modes is requested: *Referencing*, *Jogging* or *Approach start position*, from the automation. | Type BO<br>Chart 290,6 |
| H592<br>dX_Pass mark | Distance between two pass marks. | Value 1000 mm<br>Type R<br>Chart 60,6 |
| H594<br>S. Hold OM local | Source for the binary signal for delaying the local operating mode. Used to delay jogging until the jogging speed ramp output is zero. | Value 0537<br>Type B<br>Chart 290,3 |
| d595<br>OM Start Pos. | The *Approach start position* operating mode is active. | Type BO<br>Chart 290,6 |
| d596<br>OM KnifeChgPos | The *Knife change position* operating mode is active. | Type BO<br>Chart 290,6 |
| H597<br>S. EnableJog | Source of the signal for enabling jogging. In factory setting jogging is disabled while any cutting mode is active. | Value 0577<br>Type B<br>Chart 290,1 |
| d598<br>OM local | There is a request for a local operating mode. | Type BO<br>Chart 290,7 |
| d599<br>OM local2 | One of the operating modes, *Referencing* or *Jogging* is active. | Type BO<br>Chart 290,7 |
| H600<br>S. Enable Prio2 | Source of the signal to enable the cutting operating modes. The signal enables the priority logic. | Value 0001<br>Type I<br>Chart 290,1 |

| Parameter | Description | Data |
|---|---|---|
| d605<br>Enable Prio2 | Enables the status of the priority logic for cutting operating modes. | Type BO<br>Chart 290,4 |
| H606<br>Saw Blade Width | This value is added to the format setpoint in order to consider the width of the saw blade. | Value 0.0mm<br>Type R<br>Chart 190,1 |
| H607<br>S.SawBladeWidth | Source for an value which is added to the format setpoint (e.g. the saw blade width). | Value 3606<br>Type I<br>Chart 190,2 |
| H608<br>S. Limit Format | Source for a boolean control bit to activate a dynamic format size limitation. If the format is modified in automatic mode while the knife is in the starting position, this limitation avoids abrupt changes of the position setpoint of the knife. | Value 0000<br>Type I<br>Chart 190,5 |
| H610<br>S. Format DW high | Source for the high word of a 32-bit format input. In the factory setting, this is connected to PZD 7 from the basic drive. | Value 2807<br>Type I<br>Chart 190,1 |
| H611<br>S. Format DW low | Source for the low word of a 32-bit format input. In the factory setting, this is connected to PZD 6 from the basic drive. | Value 2806<br>Type I<br>Chart 190,1 |
| H612<br>Format DW Norm. | Normalization for the 32-bit format input. It involves the resolution of the input value in [mm]. | Value 0.1 mm<br>Type R<br>Chart 190,3 |
| d613<br>Format DW | 32-bit format input after normalization. Example:<br>Input: 12345<br>Normalization: 0.1 mm ⇒ reference format: 1234.5 mm | Type R<br>Chart 190,3 |
| H614<br>S. Format Word | Source for the 16-bit format input. In the factory setting, this is connected to PZD 6 from the basic drive converter. | Value 2806<br>Type I<br>Chart 190,1 |
| H615<br>Format W Norm. | Normalization for the 16-bit format input. It involves the resolution of the input in [mm]. In the factory setting, 1 mm can specify formats up to 16383 mm. | Value 1 mm<br>Type R<br>Chart 190,2 |
| d616<br>Format Word | 16-bit format input after normalization. | Type R<br>Chart 190,3 |
| H617<br>S. Format float | Source for the format input as floating-point value. In the factory setting, this is connected to a fixed value. | Value 3664<br>Type I<br>Chart 190,4 |
| d618<br>Format float | Actual value of the floating-point format input. | Type R<br>Chart 190,5 |
| d619<br>S. Format Select | Source of the control signal to select the format input source. If this signal is connected to the automation, then it is possible to toggle between 5 fixed values in operation.<br>Factory setting: Input via floating-point channel (H617). | Value 2001<br>Type I<br>Chart 190,6 |
| d620<br>Format Request | Actual format request in [mm] for continuous operation. Whether this format is actually cut, depends on the operating mode, the request of special formats (special sample) and the limit H626, H627. | Type R<br>Unit mm<br>Chart 190,7 |
| H621 ... H625<br>Fixformat 1 ....<br>Fixformat 5 | Five fixed values for the format input, which can be used to select a multiplexer and H619. | Type R<br>Chart 190,4 - 6 |
| H626<br>S. Special sheet | Source for the special sample format. | Value 3665<br>Chart 190,1 |
| H627<br>Maximum Format | Largest permissible cutting format. | Value 100.0 m<br>Type R<br>Chart 190,3 |
| H628<br>Minimum Format | Smallest permissible cutting format. | Value 0.6 m<br>Type R<br>Chart 190,3 |
| d629<br>Format Setpoint | Requested reference format after limiting and normalization (Xref_normalization) | Type R<br>Chart 190,7 |
| d630<br>Setpoint FC | Reference format (normalized) for the format controller. In continuous operation coincides with d629. Exception: 1st cut (changeover to the Long Format to synchronize to the material web) | Type R<br>Chart 220,7 |

| Parameter | Description | Data |
|---|---|---|
| H631, H632<br>S. AND3_1,<br>S. AND3_2 | Two sources of the 3rd free AND logic gate. B0631 is the output. | Type I<br>Chart 425,3 |
| H633, H634<br>S. AND4_1,<br>S. AND4_2 | Two sources of the 4th free AND logic gate. B0633 is the output. | Type I<br>Chart 425,3 |
| H640<br>S. Act. Pos. (Start) | Source for the position actual value to check whether the knife is in the starting position or is at a standstill there. | Value 3414<br>Type I<br>Chart 340,2 |
| H641<br>S. Start Position | Source for the starting position. In the factory setting, this is connected to the starting position of the format generator. This value is normalized, therefore H642, H643 and the actual value must also be normalized quantities (source H640). | Value 3161<br>Type I<br>Chart 340,2 |
| H642<br>Startpos Range | Tolerance range for the starting position identification (normalized). | Value 0.01<br>Type R<br>Chart 340,2 |
| H643<br>Startpos_Hyst | Hysteresis for the starting position identification (normalized). | Value 0.003<br>Type R<br>Chart 340,3 |
| d644<br>In Startposition | Status: The knife is in the starting position. | Type BO<br>Chart 340,4 |
| H645<br>S. n_zero (Start) | Source for the *Knife stationary* signal for the starting position evaluation. | Value 0460<br>Type I<br>Chart 340,4 |
| H646<br>DelayStartpos | Minimum time that the knife must be in the starting position, before the *Knife in the starting position* becomes *active*. | Value 500 ms<br>Type SD<br>Chart 340,6 |
| d647<br>Standing Startpos | Status: Knife is stationary at the starting position, i. e. it stays there for a defined time (H646). | Type BO<br>Chart 340,7 |
| H648<br>S. Pos. (CalcPos) | Source for the position actual value, which should be evaluated to generate a calculation pulse. Factory setting: Knife position. | Value 3413<br>Type R<br>Chart 340,1 |
| H649<br>Pos. CalcPuls | Position value where a calculation pulse is generated. The calculation pulse must be generated once per cut, and is used to progress the status for cutting operating modes. | Value 0.75<br>Type R<br>Chart 340,1 |
| H650<br>S. Enable Local | Source of the inverter enable signals due to the request, local operating modes. | Value 0591<br>Type I<br>Chart 360,1 |
| H651<br>S. Enable_PLC | Source of the inverter enable signal from the automation. | Value 0843<br>Type I<br>Chart 360,1 |
| H652<br>S. Enable Setp. | Source of the setpoint enable. | Value 0846<br>Type I<br>Chart 360,1 |
| H653 ... H656<br>S. CU ready 1 ...<br>S. CU ready 4 | 4 sources to generate the *Inverter ready* signal. All of the 4 sources are ANDed. All conditions which are not required, must be connected to a logical ‘1’ (source = 0001). | Type I<br>Chart 360,1 - 3 |
| H657<br>S. Enable Ramp | Source for the control signal *Enable ramp-function generator*. | Value 0844<br>Type I<br>Chart 360,1 |
| H658<br>S. Start Ramp | Source for the start signal *Start ramp-function generator*. | Value 0845<br>Type I<br>Chart 360,1 |
| H659<br>Enable DelayLoc | Delay time, controller enable for local operation. This is used to maintain motor magnetization when *Jogging*, *Referencing* or *Approach start position*. | Value 10 s<br>Type SD<br>Chart 360,2 |
| d660<br>Inverter ready | Status of the drive converter readiness. | Type BO<br>Chart 360,5 |
| H661<br>S. optEnableCntrl | Source for an optional controller enable. Using this signal, an additional condition can be established to enable the control (closed-loop). | Value 0001<br>Type I<br>Chart 360,5 |

| Parameter | Description | Data |
|---|---|---|
| d662<br>Enable Inverter | Signal to enable the inverter. | Type BO<br>Chart 360,5 |
| d664<br>Enable Setpoint | Signal to enable the setpoints for the inverter. | Type BO<br>Chart 360,5 |
| d666<br>Enable Controller | Status of the general controller enable. | Type BO<br>Chart 360,6 |
| H667<br>S. EPC SetpEnable | Source of the 1st condition to enable the position controller, assigned the general controller enable. | Value 0666<br>Type I<br>Chart 370,1 |
| H668<br>S. EPC calibrated | Source of the 2nd condition to enable the position controller, assigned the status whether the shears are calibrated. | Value 1310<br>Type I<br>Chart 370,1 |
| H669<br>S. EPCOM BA_local | Source of the 3rd condition to enable the position controller. This is assigned as standard with the *No local mode* signal. | Value 0600<br>Type I<br>Chart 370,1 |
| H670<br>S. EPC option | Source of the 4th condition to enable the position controller (optional). This is used for linear systems to inhibit the position controller while positioning. | Value 1346<br>Type I<br>Chart 370,1 |
| d671<br>EnablePosControl | Position controller enable status. | Type BO<br>Chart 370,4 |
| H672<br>S. Brake_CU_off | Source of the 1st enable signal to control the motor brake. This is assigned status bit OFF2 of the basic drive. | Value 0344<br>Type I<br>Chart 370,1 |
| H673<br>S. BrakeCUready | Source of the 2nd enable signal to control the motor brake. This is assigned the signal *Converter ready*. | Value 0660<br>Type I<br>Chart 370,1 |
| H674<br>S. Quick stop | Source of the 3rd enable signal to control the motor brake. This is assigned the signal *No fast stop*. | Value 0345<br>Type I<br>Chart 370,1 |
| H675<br>S. Brake_option | Source of the optional 4th enable signal to control the motor brake. | Value 0001<br>Type I<br>Chart 370,1 |
| d676<br>Release Brake | Status of the control signal to control the knife drive brake. | Type BO<br>Chart 370,4 |
| H678<br>T_Brake close | Time until the brake has closed. The brake control maintains the setpoint enable for a time, specified using H678, when withdrawing the CU operational readiness. | Value 200 ms<br>Type SD<br>Chart 370,2 |
| H679<br>T_Brake release | Time until the brake has opened. The brake control delays the setpoint enable for a time, specified using H679, after the CU operational readiness has been issued. | Value 200 ms<br>Type SD<br>Chart 370,3 |
| d680<br>Enable from Brake | Setpoint enable from the brake control. This signal takes into account the times to open and close the brake (H678, H679). | Type BO<br>Chart 370,4 |
| H690 ... H692<br>S. CB Fault 1 ...<br>S. CB Fault 3 | Selects 3 fault/error sources to monitor the COMBOARD and the data transfer via COMBOARD. | Type I<br>Chart 470,1 |
| H693<br>CB Fault Delay | Delays a fault message from COMBOARD. | Value 1000 ms<br>Chart 470,2 |
| d694<br>CB Fault | Fault status of the COMBOARD. | Type BO<br>Chart 470,3 |
| H695 ... H697<br>S. CU Fault 1 ...<br>S. CU Fault 3 | Selects 3 fault/error sources to monitor the basic drive (CU) and data transfer from CU. | Type I<br>Chart 470,1 |
| H698<br>CU Fault Delay | Delays a fault message from the CU. | Value 200 ms<br>Chart 470,2 |
| d699<br>CU Fault | Fault status of communications with the CU. | Type BO<br>Chart 470,3 |
| H700 ... H702<br>S. User Fault 1 ...<br>S. User Fault 3 | Selects 3 fault/error sources to monitor operator control errors. The sources are evaluated and signaled as user error 1. | Type I<br>Chart 470,5 |

| Parameter | Description | Data |
|---|---|---|
| H703<br>User Fault 1 Delay | Delays an error message for user error 1. | Value 1000 ms<br>Chart 470,7 |
| d704<br>User Fault 1 | Error status for user error 1. | Type BO<br>Chart 470,7 |
| d705<br>User Fault 2 | Error status for user error 2. | Type BO<br>Chart 470,7 |
| H706<br>User Fault 2 Delay | Delays an error message for user error 2. | Value 1000 ms<br>Chart 470,7 |
| H707 ... H709<br>S. User Fault 4 ...<br>S. User Fault 6 | Selects 3 fault/error sources to monitor operator control errors. The sources are evaluated and signaled as user error 2. | Type I<br>Chart 470,5 |
| H710<br>S. User Fault Enable | Source for the signal to enable user error messages. | Value 0342<br>Type I<br>Chart 470,5 |
| H715<br>Shear Pos Min | Smallest permissible knife position value. | Value -20.0<br>Type R<br>Chart 480,1 |
| H717<br>Shear Pos Max | Largest permissible knife position value. | Value 390.0<br>Type R<br>Chart 480,1 |
| H718<br>Shear Pos Toler. | Tolerance of the knife position before position errors can be generated. | Value 10.0<br>Type<br>Chart 480,2 |
| H719<br>S. EnShearPosErr | Source of the signal for enabling the knife position errors and alarms. | Value 0600<br>Type R<br>Chart 480,5 |
| H721 ... H728<br>S. PZD1 CU ...<br>S. PZD8 CU | Sources for the 8 process data, which are sent to the basic drive. | Type I<br>Chart 640,6 |
| d731 ... d738<br>PZD1 to CU ...<br>PZD8 to CU | Actual process data to the basic drive. | Type W<br>Chart 640,7 |
| H740 ... H755<br>S. ControlW1 Bit0 ...<br>S. ControlW1 Bit15 | Sources for the bits which are sent as control word 1 to the basic drive. | Type I<br>Chart 630,1 - 2 |
| H760 ... H775<br>S. ControlW2 Bit0 ...<br>S. ControlW2 Bit15 | Sources for the bits which are sent as control word 2 to the basic drive. | Type I<br>Chart 630,5 - 6 |
| H776<br>S. Setpoint1A CU | Source for the 1st setpoint for the CU (alternative A). The speed setpoint is entered in the format mode here as standard. | Value 3023<br>Type I<br>Chart 640,1 |
| H777<br>S. Setpoint1B CU | Source for the 1st setpoint for the CU (alternative B). The speed setpoint is entered in the positioning mode here as standard. | Value 3474<br>Type I<br>Chart 640,1 |
| H778<br>S. Setp1_CU_sel | Source for the signal to select setpoint1 at the CU (alternatives, refer to H776 and H777). This means that the speed setpoint for format- and positioning mode is changed-over as standard. | Value 1347<br>Type I<br>Chart 640,1 |
| d779<br>Setpoint1 CU | Actual setpoint 1 for the basic drive. | Type R<br>Chart 640,3 |
| H780<br>Setpoint1 CU Norm | Normalization for setpoint1 at the CU. This is the floating-point value, which is sent as 100% to the basic drive. | Value 1.0<br>Type R<br>Chart 640,4 |
| d781<br>Setpoint1 CU N2 | Setpoint1 at the CU after normalization as N2 type (16384 = 100%). | Type I<br>Chart 640,5 |
| H782<br>S. Setpoint2A CU | Source for the 2nd setpoint for the CU (alternative A). The torque setpoint is entered in the format mode here as standard. | Value 3025<br>Type I<br>Chart 640,1 |
| H783<br>S.Setpoint2B CU | Source for the 2nd setpoint for the CU (alternative B). The torque setpoint is entered in the positioning mode here as standard. | Value 3498<br>Type I<br>Chart 640,1 |

| Parameter | Description | Data |
|---|---|---|
| H784<br>S. Setp2_CU_sel | Source for the signal to select setpoint1 at the CU (alternatives, refer to H782 and H783). This means that the torque setpoint for format- and positioning modes are changed-over as standard. | Value 1347<br>Type I<br>Chart 640,1 |
| d785<br>Setpoint2 CU | Actual setpoint 2 for the basic drive. | Type R<br>Chart 640,3 |
| H786<br>Setpoint2 CU Norm | Normalization for setpoint2 at the CU. This is the floating-point value, which is transferred as 100% at the basic drive. | Value 1.0<br>Type R<br>Chart 640,4 |
| d787<br>Setpoint2 CU N2 | Setpoint2 at the CU after normalization as N2 type (16384 = 100%). | Type I<br>Chart 640,5 |
| H788<br>S. Setpoint3 CU | Source for the 3rd setpoint at the basic drive. | Value 3490<br>Type I<br>Chart 640,1 |
| d789<br>Setpoint3 CU | Setpoint3 at the CU after normalization as N2 type (16384 = 100%). | Type I<br>Chart 640,3 |
| H790<br>Setpoint3 CU Norm | Normalization for setpoint3 at the CU. This is the floating-point value, which is transferred as 100% at the basic drive. | Value 1.0<br>Type R<br>Chart 640,2 |
| H791<br>S. Setpoint4 CU | Source for the 4th setpoint at the basic drive. | Value 3000<br>Type I<br>Chart 640,1 |
| d792<br>Setpoint4 CU | Setpoint4 at the CU after normalization as N2 type (16384 = 100%). | Type I<br>Chart 640,3 |
| H793<br>Setpoint4 CU Norm | Normalization for setpoint4 at the CU. This is the floating-point value, which is transferred as 100% at the basic drive. | Value 1.0<br>Type R<br>Chart 640,2 |
| H794<br>S. Setpoint5 CU | Source for the 5th setpoint at the basic drive. This setpoint is transferred as 32-bit value at the CU. | Value 3000<br>Type I<br>Chart 640,1 |
| d795<br>Setpoint5 high CU | High word of the 32-bit setpoint at the CU (after normalization). | Type W<br>Chart 640,4 |
| d796<br>Setpoint5 low CU | Low word of the 32-bit setpoint at the CU (after normalization). | Type W<br>Chart 640,4 |
| H797<br>Setpoint5 CU Norm | Normalization for the setpoint at the CU. This is the floating-point value, which is transferred as 100% (32 bit) at the basic drive. | Value 1.0<br>Type R<br>Chart 640,2 |
| d801 ... d810<br>PZD1 CB inp ...<br>PZD10 CB inp | The 10 process data which are received via COMBOARD. | Type W<br>Chart 670,2 |
| H811<br>S. DW1 low CB | Source for the low word of a 32-bit process data to convert to REAL (floating point). Default: *PZD7 from CB* | Value 2807<br>Type I<br>Chart 670,4 |
| H812<br>S. DW1 high CB | Source for the high word of a 32-bit process data to convert to REAL (floating point). Default: *PZD8 from CB* | Value 2808<br>Type I<br>Chart 670,4 |
| H813<br>CB DW1 Norm | Normalization factor for the double word 1 (DW1) from COMBOARD. Calculation rule:<br>CB setpoint DW1 = H813 · process data(32 bit) / 16#40000000 | Value 1.0<br>Type R<br>Chart 670,6 |
| d814<br>CB Setpoint DW1 | 1st double word setpoint from COMBOARD as floating-point quantity. | Type R<br>Chart 670,7 |
| H816<br>S. Setpoint1 CB | 1st source to convert a 16-bit process data to REAL (floating point). Default: *PZD2 from CB* | Value 2802<br>Type I<br>Chart 670,5 |
| H817<br>CB Setpoint1 Norm | Normalization factor for the 1st setpoint from COMBOARD. Calculation rule:<br>CB setpoint1 = H817 · process data(16 bit) / 16384 | Value 1.0<br>Type R<br>Chart 610,6 |
| d818<br>CB Setpoint1 | 1st setpoint from COMBOARD as floating-point quantity | Type R<br>Chart 610,7 |

| Parameter | Description | Data |
|---|---|---|
| H819<br>S. Setpoint2 CB | 2nd source to convert a 16-bit process data to REAL (floating point). Default: *PZD3 from CB* | Value 2803<br>Type I<br>Chart 670,5 |
| H820<br>CB Setpoint2 Norm | Normalization factor for the 2nd setpoint from COMBOARD. Calculation rule:<br>CB setpoint2 = H817 · process data(16 bit) / 16384 | Value 1.0<br>Type R<br>Chart 610,6 |
| d821<br>CB Setpoint2 | 2nd setpoint from COMBOARD as floating-point quantity | Type R<br>Chart 610,7 |
| H822<br>S. Setpoint3 CB | 3rd source to convert a 16-bit process data to REAL (floating point). Default: *PZD7 from CB* | Value 2807<br>Type I<br>Chart 670,5 |
| H823<br>CB Setpoint3 Norm | Normalization factor for the 3rd setpoint from COMBOARD. Calculation rule:<br>CB setpoint3 = H817 · process data(16 bit) / 16384 | Value 1.0<br>Type R<br>Chart 610,6 |
| d824<br>CB Setpoint3 | 3rd setpoint from COMBOARD as floating-point quantity | Type R<br>Chart 610,7 |
| H825<br>S. ActValue1 CB | Source of the 1st actual value, which is sent via the COMBOARD. Factory setting: Material velocity. | Value 3435<br>Type I<br>Chart 700,1 |
| d826<br>ActValue1 CB | 1st actual value for the COMBOARD after normalization. | Type I<br>Chart 700,3 |
| H827<br>ActValue1 CB Norm | Normalization for the 1st actual value at the COMBOARD.  Conversion:<br>*Actual value1 CB* = 16384 · value_of the _source(H825) / H827 | Value 1.0<br>Type R<br>Chart 700,2 |
| H828<br>S. ActValue2 CB | Source of the 2nd actual value, which is sent via the COMBOARD. Factory setting: Knife speed. | Value 3411<br>Type I<br>Chart 700,1 |
| d829<br>ActValue2 CB | 2nd actual value for the COMBOARD after normalization. | Type I<br>Chart 700,3 |
| H830<br>ActValue2 CB Norm | Normalzation for the 2nd actual value at the COMBOARD.  Conversion:<br>*Actual value2 CB* = 16384 · value_of the_source(H828) / H830 | Value 1.0<br>Type R<br>Chart 700,2 |
| H831<br>S. ActValue3 CB | Source of the 3rd actual value, which is sent via the COMBOARD. Factory setting: Material velocity. | Value 3445<br>Type I<br>Chart 700,1 |
| d832<br>ActValue3 CB | 3rd actual value for the COMBOARD after normalization. | Type I<br>Chart 700,3 |
| H833<br>ActValue3 CB Norm | Normalization for the 3rd actual value at the COMBOARD.  Conversion:<br>*Actual value3 CB* = 16384 · value_of the_source(H831) / H833 | Value 1.0<br>Type R<br>Chart 700,2 |
| H834<br>S. ActValue4 CB | Source of the 4th actual value, which is sent via the COMBOARD. | Value 3000<br>Type I<br>Chart 700,1 |
| d835<br>ActValue4 CB | 4th actual value for the COMBOARD after normalization. | Type I<br>Chart 700,3 |
| H836<br>ActValue4 CB Norm | Normalization for the 4th actual value at the COMBOARD.  Conversion:<br>*Actual valuet4 CB* = 16384 · value_of the _source(H834) / H836 | Value 1.0<br>Type R<br>Chart 700,2 |
| H837<br>S. ActValue5 CB | Source for the 5th actual value, which is sent via the COMBOARD. The value can either be sent as 16-bit- or 32-bit process data. | Value 3000<br>Type I<br>Chart 700,1 |
| d838<br>ActValue5 high CB | High word of the 5th actual value for the COMBOARD after normalization. This value should be transferred if only 16-bit PZD are used. | Type I<br>Chart 700,3 |
| d839<br>ActValue5 low CB | Low word of the 5th actual value for the COMBOARD after normalization. | Type I<br>Chart 700,3 |
| H840<br>ActValue5 CB Norm | Normalization for the 5th actual value at the COMBOARD.  Conversion:<br>*Actual value5 CB* = 16#40000000 · value_of the _source(H837) / H879 | Value 1.0<br>Type R<br>Chart 700,2 |

| Parameter | Description | Data |
|---|---|---|
| H841<br>S. CB_Control W1 | Source for the CB control word 1. In the factory setting, this is connected to the 1st PZD from COMBOARD. | Value 2801<br>Type I<br>Chart 680,1 |
| H842<br>S.CB CTW Simulation | Source of the simulated control word1 from CB. | Value 2621<br>Type I<br>Chart 680,1 |
| d843<br>CB CTW1 | CB control word1. Control word 1 at the basic drive is formed from this. | Type W<br>Chart 680,2 |
| H844<br>S. CB Shear CTW | Source for the shears control word from COMBOARD. This is connected to the 10th PZD from COMBOARD in the factory setting. | Value 2810<br>Type I<br>Chart 680,5 |
| d845<br>CB Shear CTW | Shears control word from COMBOARD. This is used to form shears control words 1 and 2 (d539, d543). | Type W<br>Chart 680,5 |
| d846<br>Status Word 1 CB | Status word 1. Intended for transfer as 1st PZD from COMBOARD. | Type W<br>Chart 690,4 |
| d847<br>Status Word 2 CB | Status word 2. Intended for transfer as 4th PZD from COMBOARD. | Type W<br>Chart 690,7 |
| H901 ... H910<br>S. PZD1 CB ...<br>S. PZD10 CB | Sources for the 10 process data, which are output via COMBOARD. | Type I<br>Chart 700,5 |
| d911 ... d920<br>PZD1 CB out ...<br>PZD10 CB out | Actual values of the 10 process data output via COMBOARD. | Type W<br>Chart 700,6 |
| d921<br>CB Receive init | Status of the initialization data receive from COMBOARD.<br>1: Receive software and hardware were able to be initialized. | Type BO<br>Chart 660,3 |
| d922<br>CB Transmit init | Status of the initialization of data output via COMBOARD.<br>1: Output software and hardware were able to be initialized. | Type BO<br>Chart 660,3 |
| H923<br>Drive code | Defines the plant/system ID (d003). | Value 0<br>Type DI<br>Chart 50,2 |
| d924<br>Timeout CB | Status of the time monitoring from COMBOARD. The monitoring times can be specified using H926 and H929.<br>1: Timeout | Type BO<br>Chart 660,6 |
| H925<br>CB Enable | Enables communications with COMBOARD. | Value 1<br>Type BO<br>Chart 660,1 |
| H926<br>CB tmax Run | Time limiting for cyclic operation. If no valid messages are received within this time, timeout is signaled. | Value 100 ms<br>Type SD<br>Chart 660,1 |
| d927<br>CB Receive Status | Status of the receive unit of the COMBOARD. Numerical schematic, refer to Lit. /3/ and CFC Online Help.<br>Caution: The status word represents the coding of an operating status. It cannot be interpreted bitwise. The value does not have to be a constant 0, even in regular operation (e. g. 16#6003, if new data are not available at each cycle). | Type W<br>Chart 660,3 |
| H928<br>Mask CB Status | Mask to suppress certain bits of the CB receive status word. Setting: Interrupt communications (remove cable) and evaluate d927. | Value 16#FFFF<br>Type W<br>Chart 660,4 |
| H929<br>tmax CB PowerON | If no data are received via COMBOARD within this time after the power supply has been switched-in, timeout is signaled. | Value 20 s<br>Type SD<br>Chart 660,5 |
| H930<br>S. Setpoint4 CB | 4th source to convert a 16-bit process data into REAL (floating point). Default: *PZD5 from CB* | Value 2805<br>Type I<br>Chart 670,5 |
| H931<br>CB Setpoint4 Norm | Normalization factor for the 4th setpoint from COMBOARD. Calculation rule:<br>CB setpoint4 = H831 · process data(16 bit) / 16384 | Value 1.0<br>Type R<br>Chart 610,6 |
| d932<br>CB Setpoint4 | 4th setpoint from COMBOARD as floating-point quantity | Type R<br>Chart 610,7 |

| Parameter | Description | Data |
|---|---|---|
| H933 ...H936<br>S. Logic5_I1 ...<br>S. Logic5_I4 | Sources for the digital input signals of the 5th parameterizable logic. | Type<br>Chart 421,1 |
| H937 ...H938<br>Logic5_MS1 ...<br>Logic5_MS2 | Masks for 4 setting functions of the 5th parameterizable logic (refer to Chart 400). | Type<br>Chart 421,2 |
| H939<br>Logic_MR1 | Mask for a reset function of the 5th parameterizable logic (evaluation, refer to Chart 400) | Type<br>Chart 421,2 |
| H940<br>Logic_MR | Mask for a reset function of the 5th parameterizable logic (evaluation, refer to Chart 400) | Type<br>Chart 421,2 |
| H941 ...H944<br>S. Logic6_I1 ...<br>S. Logic6_I4 | Sources for the digital input signals of the 6th parameterizable logic. | Type<br>Chart 421,4 |
| H945 ...H946<br>Logic_MS1 ...<br>Logic_MS2 | Masks for 4 setting functions of the 6th parameterizable logic (refer to Chart 400). | Type<br>Chart 421,5 |
| H947<br>Logic6_MR1 | Mask for a reset function of the 6th parameterizable logic (evaluation, refer to Chart 400) | Type<br>Chart 421,5 |
| H948<br>Logic6_MR | Mask for a reset function of the 6th parameterizable logic (evaluation, refer to Chart 400) | Type<br>Chart 421,5 |
| H950 ... H965<br>S. Fault Bit 0 ...<br>S. Fault Bit 15 | Source of the error bits to display faults and alarms.<br>Fault sources in the factory setting:<br>Bit 0 0694 Communications via CB<br>Bit 1 0699 Communications to the basic drive<br>Bit 2 0000 Not assigned<br>Bit 3 0704 User error 1<br>Bit 4 0705 User error 2<br>Bit 5 0682 Knife position lower than the lower limit value<br>Bit 6 0103 Overspeed, knife (positive)<br>Bit 7 0104 Overspeed, knife (negative)<br>Bit 8 0116 Knife drive blocked<br>Bit 9 0125 Pulse encoder error (speed actual value isn't plausible)<br>Bit 10 0521 External fault 1<br>Bit 11 0522 External fault 2<br>Bit 12 0684 Knife position is greater than the upper limit value<br>Bit 13 0443 Material position is less than the lower limit value<br>Bit 14 0157 Error, absolute value encoder (TR encoder)<br>Bit 15 0000 Not assigned | Type I<br>Chart 530,1 - 2 |
| H966<br>Fault Mask | Mask to enable fault trips. The mask is ANDed with the fault bits (d968, H950ff). | Value 16#33E2<br>Type W<br>Chart 530,4 |
| H967<br>Alarm Mask | Mask to enable alarm messages. The mask is ANDed with the fault bits (d968, H950ff). | Value 16#FFFF<br>Type W<br>Chart 530,4 |
| d968<br>Fault Bit | Status of the fault/error sources, selected using parameters H950 ... H965. | Type W<br>Chart 530,4 |
| H969<br>Fault Start Delay | Delays when signaling faults and alarms after the module has been powered-up. The fault bits are ignored during this time. | Value 10 s<br>Type SD<br>Chart 530,4 |
| H970<br>System Error Mask | Mask to suppress system fault bits. Assignment bit0 .. bit15:<br>Bit 3 Task administration<br>Bit 5 Hardware fault<br>Bit 6 Communications error<br>Bit 10 User error | Value 16#FFFF<br>Type W<br>Chart 510,2 |
| d971<br>CU Receive init | Status of the receive channel from the basic drive<br>1: Receive channel was correctly initialized | Type BO<br>Chart 600,4 |
| d972<br>CU Transmit init | Status of the send channel to the basic drive<br>1: Send channel was correctly initialized | Type BO<br>Chart 600,4 |
| d973<br>CU Timeout | Status of the process data receive from the basic drive<br>1: No data were received for longer than 100 ms | Type BO<br>Chart 600,4 |

| Parameter | Description | Data |
|---|---|---|
| d974<br>CU in Operation | Status of the basic drive monitoring<br>1: Basic drive available and operational | Type BO<br>Chart 600,4 |
| H975<br>S. Disable Resynch | Source of the signal to inhibit synchronization of the T400 from the basic drive. The function is only effective for the cross-cutter version. | Value 0666<br>Type I<br>Chart 600,2 |
| H976<br>Resynchr Delay | Delay with the synchronization of the T400 with the basic drive. This synchronization is established H976 ms after the basic drive has been identified (only for cross-cutters). | Value 1000 ms<br>Type SD<br>Chart 600,4 |
| H977<br>T Resynchr T400 | Period of the clock signal, which can be used to re-synchronize the T400 with the basic drive. This function is optional, as a single synchronization after power-on for the drive converters intended, is sufficient. | Value 10 s<br>Type SD<br>Chart 600,3 |
| H978<br>Fan_off_Delay | Delay to power-down the fan. | Value 30 s<br>Type SD<br>Chart 510,4 |
| H980<br>TechBoardParaType | Defines the data transfer format for floating-point values to the technology boards.<br>0 As 32-bit integer (standard)<br>1 As floating-point value (reserved for special applications) | Value 0<br>Type BO<br>Chart 50,2 |
| H981<br>COMBOARD ParaType | Defines the data transfer format for floating-point values via the COMBOARD channel.<br>0 As 32-bit integer (standard)<br>1 As floating-point value (reserved for special applications) | Value 0<br>Type BO<br>Chart 50,2 |
| H982<br>T400 Baseboard | This means that the T400 can be used for special applications as baseboard (if required with another technology board). In this case, all of the parameter numbers shift by 1000 downwards (P123 is obtained from H123 etc.). | Value 0<br>Type BO<br>Chart 50,2 |
| H984<br>Key EEPROM | Password to establish the factory settings. If this parameter is set to 165, then all of the parameters are set to the status when the equipment was originally supplied.<br>**CAUTION**: This procedure cannot be undone. | Value 0<br>Type I<br>Chart 50,2 |
| d985<br>Status EEPROM | Change status of the standard configured software:<br>0 Parameters were changed<br>1 Factory settings | Type BO<br>Chart 50,4 |
| d986 ... d990<br>CPU load T1 ...<br>CPU load T5 | Computer utilization sorted according to time sectors. 1.0 means 100% utilization. The utilization of fast time sectors is included in the utilization of slow time sectors. | Type R<br>Chart 540,2 |
| d998, d999<br>SIMADYN D<br>SIMOVIS SW ID | Reserved for automatic identification of a SIMADYN D module by SIMOVIS. | Type I<br>Chart 50,4 |
| L000 ... L015<br>S. Status1CB Bit0 ...<br>S. Status1CB B15 | Sources for the 16 bits, which are transferred to the COMBOARD as status word1. | Type I<br>Chart 690,1 - 2 |
| L020 ... L035<br>S. Status2CB Bit0 ...<br>S. Status2CB B15 | Sources for the 16 bits, which are transferred to the COMBOARD as status word2. | Type I<br>Chart 690,4 - 5 |
| L036<br>Cam Reset Mode | L036 = 0: Cams may be shifted even passing position step (saw-toth function of the position with rotary axis)<br>L036 = 1: Cams will be automatically reseted when the input position steps over the end of the saw-tooth fucntion. | Value 0<br>Type BO<br>Chart 380,6 |
| L037<br>Cam deltaPos. Max | If the cam controller actual position value change is more than L037 and is contrary to the actual sense of rotation, this is interpreted as position setting operation rather than a reversal. | Value 100.0<br>Type R<br>Chart 380,7 |
| L038, L039<br>S. Cam_X+<br>S. Cam_X- | Two sources for subtracting an offset value for the input position of the cam controller. | Type I<br>Chart 380,1 |
| L040<br>S. ActpPos. Cam | Source for the position actual value for the cam controller | Value 3038<br>Type I<br>Chart 380,3 |
| L041<br>S. Speed Cam | Source for the speed/velocity actual value to the position actual value of the cam controller. | Value 3411<br>Type I<br>Chart 380,3 |

| Parameter | Description | Data |
|---|---|---|
| L042<br>S. Speed Norm. Cam | Source for the normalization of L041. The normalization is given by:<br>( change in the position L040 ) / ( time for the position change )<br>for a velocity 1.0 (at L041) | Value 3040<br>Type I<br>Chart 380,3 |
| L043<br>S. Cam Enable pos. | Enable the cams for position velocities. | Value 0001<br>Type BO<br>Chart 380,5 |
| L044<br>S. Cam enable neg. | Enable the cams for negative velocities. | Value 0<br>Type BO<br>Chart 380,5 |
| L045<br>Cam Pos. Max | Maximum position actual value of the cam controller (for drum-type shears, e.g. 360°). If the position overflow processing is required; e. g. if the cam is shifted with respect to time, and therefore enters the range of the discontinuous position location. | Value 360.0<br>Type R<br>Chart 380,7 |
| L046<br>Cam Pos. Min | Minimum position actual value of the cam controller (for drum-type shears, e.g. 0°; refer to L045). | Value 0.0<br>Type R<br>Chart 380,8 |
| L047 ... L049<br>Cam1_XA,<br>Cam1_XB,<br>Cam1_DT | Position and time offset of the 1st cam:<br>XA: Switch-on threshold (for a negative speed switch-off threshold)<br>XB: Shutdown threshold (for a negative speed switch-on threshold)<br>DT: Time offset in ms; positive values ➔ premature switch-on<br>negative values ➔ late switch-on | Type R<br>Chart 380,1 – 2 |
| L050 ... L052<br>Cam2_XA,<br>Cam2_XB,<br>Cam2_DT | Position and time offset of the 2nd cam; refer to L047 | Type R<br>Chart 380,3 – 4 |
| L053... L055<br>Cam3_XA,<br>Cam3_XB,<br>Cam3_DT | Position and time offset of the 3rd cam; refer to L047 | Type R<br>Chart 380,5 – 6 |
| L056 ... L058<br>Cam4_XA,<br>Cam4_XB,<br>Cam4_DT | Position and time offset of the 4th cam; refer to L047 | Type R<br>Chart 380,7 - 8 |
| L060<br>Peer Baud Rate<br>*Initialization par.* | Baud rate of the peer-to-peer interface.<br>Permissible values: 9600, 19200, 38400, 93750, 187500 | Value 19200<br>Type DI<br>Chart 780,1 |
| c061 ... c065<br>PZD1 Peer ...<br>PZD5 Peer | 5 process data from the peer-to-peer interface. | Type W<br>Chart 790,2 |
| L066<br>Peer Enable<br>*Initialization par.* | Enables the peer-to-peer interface. Enabling will initiate an error state and becomes valid after the next power on.<br>Do not enable while cutting is active! | Value 0<br>Type BO<br>Chart 780,1 |
| L067<br>tmax Peer Run | Time limit to receive data via the peer-to-peer interface in cyclic operation. Valid data must be received within this time. | Value 100 ms<br>Type SD<br>Chart 780,1 |
| C068<br>Peer Receive init | Status: Data receive via peer-to-peer interface was able to be correctly initialized. | Type BO<br>Chart 780,4 |
| C069<br>Peer Receive Status | Status of the receive condition of the peer-to-peer interface<br>(refer to the SIMADYN D communication error messages /3/ and CFC online help).<br>Caution: The status word is a coding of the operating status. It cannot be interpreted bitwise. The value does not have to be constant 0 in regular operation (e. g. 16#6003 if new data are not available in each cycle). | Type W<br>Chart 780,4 |
| C070<br>Peer Transmit init | Status: Sending via the peer-to-peer interface was able to be correctly initialized. | Type BO<br>Chart 780,4 |
| L071 ... L075<br>S. Peer PZD1...<br>S. Peer PZD5 | Source for 5 process data for output at the peer-to-peer interface. (Setting of L085, observe L086!) | Type I<br>Chart 790,5 |
| L076<br>Mask Peer Status | Mask to suppress specific bits of the peer receive status word. Setting: Interrupt communications (withdraw the cable) and evaluate c894. | Value 16#FFFF<br>Type W<br>Chart 780,4 |

| Parameter | Description | Data |
|---|---|---|
| L077<br>tmax PeerPowerON | A timeout is signaled if, after the power supply has been powered-up, no data are received from the peer-to-peer interface. | Value 20 s<br>Type SD<br>Chart 780,6 |
| c078<br>Peer Timeout | Status of the time monitoring of the peer-to-peer interface. The monitoring times can be specified using L892 and L896.<br>1: Timeout | Type BO<br>Chart 780,7 |
| L080<br>S. Peer DW1 | Source for the double word, which should be output at the peer-to-peer interface as PZD2 and PZD3. (Set L085 to 1!) | Value 5000<br>Type I<br>Chart 790,5 |
| L081<br>S. Peer DW2 | Source for the double word, which should be output at the peer-to-peer interface as PZD4 and PZD5. (Set L086 to 1!) | Value 5000<br>Type BO<br>Chart 790,5 |
| L083<br>S. Peer Float1 | Source for the floating-point value, which should be output at the peer-to-peer interface as PZD2 and PZD3. (Set L085 to 2!) | Value 3000<br>Type BO<br>Chart 790,5 |
| L084<br>S. Peer Float2 | Source for the floating-point value, which should be output at the peer-to-peer interface as PZD4 and PZD5. (Set L086 to 2!) | Value 3000<br>Type BO<br>Chart 790,5 |
| L085<br>Peer Sendtype1 | Selects the data for output as PZD1 and PZD2 of the peer-to-peer interface:<br>0: Two 16-bit words according to L072 and L073<br>1: Double word according to L080<br>2: Floating-point value according to L083 | Value 0<br>Type BO<br>Chart 790,6 |
| L086<br>Peer Sendtype2 | Selects the data for output as PZD3 and PZD4 of the peer-to-peer interface:<br>0: Two 16-bit words according to L074 and L075<br>1: Double word according to L081<br>2: Floating-point value according to L084 | Value 0<br>Type BO<br>Chart 790,6 |
| c090<br>Enable TR encoder | Status of the enable for TR encoder processing. | Type BO<br>Chart 50,6 |
| c091<br>Enable T400 AbsEnc | Status of the enable for the absolute value encoder evaluation on T400. | Type BO<br>Chart 50,7 |
| c092<br>En.CU AbsEnc | Status of the enable for the absolute value encoder evaluation from the basic drive. | Type BO<br>Chart 50,7 |
| c093<br>Enable AbsEnc | Status, absolute value encoder available. | Type BO<br>Chart 50,6 |
| L094<br>SynchronToleranc | Maximum deviation between shear speed and material speed which is still regarded as synchronous operation (relation to reference speed). | Value 1 %<br>Type R<br>Chart 480,6 |
| L100<br>S. Diagn_n_Shear | Source for the speed signal, which is used for overspeed monitoring. | Value 3411<br>Type I<br>Chart 480,1 |
| L101<br>n_Shear Max | Maximum permissible knife speed (normalized to the reference speed). | Value 1.2<br>Type R<br>Chart 480,3 |
| L102<br>n_Shear Hyst | Hysteresis of the knife speed monitoring (normalized to the reference speed). | Value 0.05<br>Type R<br>Chart 480,3 |
| c103<br>Overspeed pos | Status display: Overspeed positive, knife | Type BO<br>Chart 480,4 |
| c104<br>Overspeed neg | Status display: Overspeed negative, knife | Type BO<br>Chart 480,4 |
| L105<br>S. Blocking speed | Source for the speed signal, which is used as actual speed for the knife blockage protection monitoring. | Value 3411<br>Type I<br>Chart 490,1 |
| L106<br>speed BlockLim | As long as the knife speed is less than this value, the knife could be blocked. | Value 0.005<br>Type R<br>Chart 490,2 |
| L108<br>S. Blocking nsetp | Source for the speed signal, which is to be used as reference speed for the knife blockage protection monitoring. | Value 3023<br>Type I<br>Chart 490,1 |

| Parameter | Description | Data |
|---|---|---|
| L110<br>n_setp BlockLim | Limit value of the reference speed, above which the blockage protection should be activated. | Value 0.01<br>Type R<br>Chart 490,4 |
| L112<br>S. Blocking act Torque | Source for the actual value of the torque for the knife blockage protection monitoring. | Value 3325<br>Type I<br>Chart 490,1 |
| L113<br>act Torque BlockLim | Limit value of the torque actual value, above which the blockage protection should be activated. | Value 0.8<br>Type R<br>Chart 490,4 |
| L115<br>Blocking Delay | Delay time with which the “Knife blocked“ signal should be transferred. | Value 1000 ms<br>Type SD<br>Chart 490,6 |
| c116<br>Shear Blocking | Status of the blockage protection monitoring:<br>1: Knife is blocked | Type BO<br>Chart 490,7 |
| c117<br>Encoder Fault User | This status signal indicates an error, pulse encoder configuring (refer to d412, d434). | Type BO<br>Chart 500,4 |
| L118<br>S. act Speed_CU | Source for the actual value of the knife speed from the basic drive for checking the plausibility of the pulse encoder parameterization. | Value 3319<br>Type I<br>Chart 500,1 |
| L119<br>S. act Speed_T400 | Source for the actual value of the knife speed on the T400 for checking the plausibility of the pulse encoder parameterization. | Value 3411<br>Type I<br>Chart 500,1 |
| c120<br>Speed Error | Difference between the knife speed measured on the T400 and in the basic drive. The difference must be ≈ 0 if the pulse encoder was correctly parameterized and speed normalization. | Type R<br>Chart 500,3 |
| L121<br>Limit Delta_n | Maximum permissible speed deviation when checking the plausibility of the pulse encoder parameterization. | Value 0.1<br>Type R<br>Chart 500,3 |
| c122<br>Delta_n > Limit | Result of the comparison between the knife speed measured values on the T400 and in the basic drive.<br>1: Measured values deviate out of range | Type BO<br>Chart 500,5 |
| L123<br>S. Enable Delta_n | Source for the enable, checking the plausibility of the knife speed.<br>Factory setting: The check is inhibited while the absolute position of a TR encoder is read-in. | Value 0150<br>Type I<br>Chart 500,4 |
| L124<br>Delta_n Delay | Delay time with which an error, identified by the knife speed plausibility check, is transferred. | Value 10 s<br>Type SD<br>Chart 500,6 |
| c125<br>Delta_n Fault | Error status of the knife speed plausibility check.<br>1: Error has been identified | Type BO<br>Chart 500,7 |
| L139<br>S. TR Acknowledge | Source for the signal to acknowledge a TR encoder fault/error. | Value 0584<br>Type I<br>Chart 165,4 |
| L140<br>S.TR Load Output | Source for the load output of the TR encoder. Using this signal, the encoder signals that the absolute position is being transferred. | Value 0000<br>Type I<br>Chart 165,1 |
| L141<br>S. TR Start Load | Source of the control signal which is used to start the load operation (reading-in the absolute position) of a TR encoder. | Value 0000<br>Type I<br>Chart 165,1 |
| L142<br>S. TR CU disabled | Source for the enable condition to read-in the absolute position of a TR encoder.<br>Factory setting: Data can only be read-in with the inverter inhibited. | Value 0663<br>Type I<br>Chart 165,1 |
| L143<br>S. TR n_zero | Source of the knife standstill identification for the error evaluation of the TR encoder. While the absolute position is being read-in, a speed which differs from zero must be measured (TR encoders generate pulse trains on the incremental encoder tracks). | Value 0460<br>Type I<br>Chart 165,1 |
| L144<br>S. TR Enable | Source for the general enable of the TR encoder. | Value 0090<br>Type I<br>Chart 165,3 |
| c145<br>TR Load request | Status of the request to transfer the absolute position of a TR encoder. The signal remains at ‘1’ throughout the complete load operation. | Type BO<br>Chart 165,5 |

| Parameter | Description | Data |
|---|---|---|
| L146<br>TR End Delay | After the TR encoder has signaled the start of the load operation, the load request is withdrawn, delayed by L146 ms. | Value 120 ms<br>Type SD<br>Chart 165,6 |
| c147<br>TR complete | The signal indicates whether the absolute position of a TR encoder was read-in.<br>1: Position was read-in. | Type BO<br>Chart 165,2 |
| c148<br>TR Load input | Status of the request to transfer the absolute position of a TR encoder. The signal is used to control the encoder. It is withdrawn, delayed after the load operation has started (L146). | Type BO<br>Chart 165,7 |
| c149<br>TR Loading active | Displays an active load operation. | Type BO<br>Chart 165,7 |
| L150<br>TR StartErrDelay | Timeout monitoring time for the start of the TR encoder load operation. The encoder must start the load operation within this time. | Value 1.0 s<br>Type SD<br>Chart 165,3 |
| L151<br>TR Timeout Delay | Timeout monitoring time for the duration of the TR encoder load operation. The load operation must have been completed within this time. | Value 20.0 s<br>Type SD<br>Chart 165,3 |
| L152<br>TR n_Error Delay | Time where a “Frequency = 0 error“ must be available for a TR encoder load operation, before the error is initiated. It is expected that a speed not equal to zero will be obtained due to the load operation. | Value 1.0 s<br>Type SD<br>Chart 165,3 |
| L153<br>TR Start Delay | Delay time when automatically starting the load operation for TR encoders. Factory setting: After the system is switched-in, the load operation is initiated with a L153 ms delay. | Value 1000 ms<br>Type SD<br>Chart 165,4 |
| c154<br>TR Start error | Indicates that the TR encoder has not started the load operation within the requested time (L150). | Type BO<br>Chart 165,5 |
| c155<br>TR Timeout | Indicates that the load operation of the TR encoder takes longer than is permissible (L151). | Type BO<br>Chart 165,5 |
| c156<br>TR Frequency Zero | Indicates that during the load operation of the TR encoder, no pulses nor incremental encoder tracks were identified. | Type BO<br>Chart 165,5 |
| c157<br>TR Error | Group error message for the TR encoder | Type BO<br>Chart 165,6 |
| L158<br>AbsEncoder Type | Selecting the absolute value encoder type:<br>0: No absolute value encoder used<br>1: TR encoder<br>2: SSI- or EnDat encoder connected to the T400 terminals<br>3: Absolute value encoder connected to the basic drive | Value 0<br>Chart 50,5 |
| L160<br>AENC resolution | Resolution of the absolute value encoder (steps per revolution)<br>(SSI, EnDat connected to T400) | Value 8192<br>Type<br>Chart 150,2 |
| L161<br>AENC Number Turns | Number of revolutions of a multi-turn encoder (0 signifies single-turn encoder).<br>(SSI, EnDat connected to T400) | Value 0<br>Type DI<br>Chart 150,20 |
| L162<br>AENC Zero Bits | Number of fill bits, which are transferred by an SSI protocol before the position value.<br>(SSI, EnDat connected to T400) | Value 0<br>Type I<br>Chart 150,3 |
| L163<br>AENC PosAlarmbit | Position of the alarm bit in the SSI protocol (SSI connected to T400)<br>0: No alarm bit available | Value 0<br>Type I<br>Chart 150,3 |
| L164<br>AENC Frequency | Selects the clock frequency (and period) of the transfer clock cycle for the absolute value encoder (SSI, EnDat connected to T400).<br>0 100 kHz ( 10 µs)<br>1 500 kHz ( 2 µs)<br>2 1 MHz ( 1 µs)<br>3 2 MHz (0.5 µs) | Value 0<br>Type I<br>Chart 150,3 |
| L165<br>AENC Encoder Type | Selects the absolute value encoder type (SSI, EnDat connected to T400).<br>0 SSI rotary encoder<br>1 SSI length measuring system<br>2 EnDat rotary encoder<br>3 EnDat length measuring system<br>4 SSI length measuring system with range correction<br>5 EnDat length measuring system with range correction | Value 2<br>Type I<br>Chart 150,4 |

| Parameter | Description | Data |
|---|---|---|
| L166<br>AENC Data Code | Codes the measured value from absolute value encoders (SSI, EnDat connected to T400).<br>0 Binary<br>1 Gray code<br>2 Gray excess code | Value 0<br>Type I<br>Chart 150,4 |
| L167<br>AENC Parity | Enables the parity monitoring in the SSI protocol of an absolute value encoder.<br>(for SSI, EnDat connected to T400). | Value 0<br>Type BO<br>Chart 150,5 |
| L168<br>AENC i_Gearbox | Ratio of the gearbox between the absolute value encoder and knife. The value must be 1.0 to clearly determine knife positions.<br>(for SSI, EnDat connected to T400). | Value 1.0<br>Type R<br>Chart 150,4 |
| L169<br>AENC Pos. Norm | Position normalization of the absolute value encoder. The position value is calculated in [revolutions] and output, multiplied by L169.<br>(for SSI, EnDat connected to T400). | Value 1.0<br>Type R<br>Chart 150,2 |
| L170<br>AENC n_Norm | Speed normalization of the absolute value encoder. The value can be selected as required, as the absolute value encoder speed cannot be used, as standard for other functions.<br>(for SSI, EnDat connected to T400). | Value 1.0<br>Type R<br>Chart 150,3 |
| L171<br>AENC n_max | Maximum permissible speed value (normalization revolutions/minute). If the knife speed exceeds this limit, bit1 of the error code (c177) is set.<br>(for SSI, EnDat connected to T400). | Value 6000 1/min<br>Type R<br>Chart 150,4 |
| L172<br>S. AENC Reset | Source of the signal to reset the absolute value generator sensing and to acknowledge error messages from the absolute value encoder.<br>(for SSI, EnDat connected to T400). | Value 0000<br>Type I<br>Chart 150,1 |
| L173<br>S. AENC Offset | Source of the absolute value encoder offset. The offset can be used for zero point correction. It is subtracted from the measured value.<br>(for SSI, EnDat connected to T400). | Value 3000<br>Type I<br>Chart 150,1 |
| L174<br>AENC Mask YF | Mask to select individual fault bits of the hardware fault identification (refer to c176).<br>(for EnDat connected to T400). | Value 16#FFFF<br>Type W<br>Chart 150,5 |
| L175<br>AENC Mask YFC | Mask to select individual error bits of the software error indentation (refer to c177).<br>(for EnDat connected to T400). | Value 16#FFFF<br>Type W<br>Chart 150,6 |
| c176<br>AENC YF | Error code for the hardware fault monitoring in the EnDat encoder. The significance of the individual bits can be taken from the data sheets of the encoder.<br>(for EnDat connected to T400). | Type W<br>Chart 150,5 |
| c177<br>AENC YFC | Error code of the software error monitoring of the SSI- or EnDat encoder.<br>Bit 0 Permissible speed exceeded (configured sampling time too slow)<br>Bit 1 Speed limit exceeded (L171)<br>Bit 2 Time overflow (EnDat encoder does not respond)<br>Bit 3 Communications error (sporadic; poor contact?)<br>Bit 4 Communications error (too many errors; protocol, parity correctly selected?)<br>Bit 6 ... 11 Configuring error (illegal values for L160 ... L167)<br>(for SSI, EnDat connected to T400). | Type W<br>Chart 150,6 |
| c178<br>AENC Error | Group fault message of the absolute value encoder sensing on the T400. | Type BO<br>Chart 150,7 |
| c179<br>AENC Encoder Pos. | Position value of the absolute value encoder on the T400 without normalization or conditioning. For multi-turn encoders, the most significant bits represent the number of revolutions. | Type R<br>Chart 150,5 |
| c180<br>AENC Pos. Single | Normalized position value of the absolute value encoder on the T400 without the multi-turn positions. For L169 = 1.0, c180 lies in the range $0 \leq c180 < 1.0$ revolutions. This value can be used to initialize the position of drum-type shears. | Type R<br>Chart 150,6 |
| c181<br>AENC Pos. Multi | Normalized position value of the absolute value encoder on the T400 including multi-turn positions. For L169 = 1.0, the position is displayed in [revolutions]. This value can be used to initialize linear positioned shears. | Type R<br>Chart 150,5 |
| c182<br>AENC Speed | Speed of the absolute value encoder on the T400 in revolutions/min · L170. | Type R<br>Chart 150,6 |
| L183<br>S. Abs Position | Source of the absolute position normalized in [revolutions] to normalize to the internal knife position normalization. | Value 3291<br>Type I<br>Chart 150,6 |

| Parameter | Description | Data |
|---|---|---|
| L189, L190<br>S. V_Cut Polygon<br>S. NV_Cut Polygon | Two sources for multiplying the derivation of the the cutting curve. | Type<br>Chart 450,5 |
| L191, L192<br>S. V_Friction<br>S. NV_Friction | Two sources for multiplying the derivation of the the friction curve. | Type<br>Chart 460,5 |
| L193, L194<br>S. V_Inertia<br>S. NV_Inertia | Two sources for multiplying the dreivation of the the inertia curve. | Type<br>Chart 460,5 |
| L195, L196<br>S. SV set Ref_1<br>S. SV set Ref_2 | Two sources for setting the reference position during the cutting operation. | Type<br>Chart 180,1 |
| L197<br>S. SV_Longformat | Source of the "Longfomat " variable used to calculate the set value of the reference position for the first sheet after starting the cutting operation. | Value 3098<br>Type<br>Chart 180,3 |
| L198<br>S. SV_StartSel | Source of the signal for selecting the set value when starting the cutting having material detected. | Value 0000<br>Type<br>Chart 180,1 |
| L199<br>S. SV_StartVal | Source for an alternative starting length value for the setting value of the material position. | Value 3000<br>Type<br>Chart 180,1 |
| L200<br>S. SV_Format | Source for the cut format to calculate the setting value of the material position. | Value 3629<br>Type I<br>Chart 180,1 |
| L201<br>S. SV_Start Size | Source for the starting length (refer to d162) to calculate the setting value of the material position. | Value 3162<br>Type I<br>Chart 180,1 |
| L202<br>S. SV_Set Value | Source for the setting value of the material position for continuous cutting operation. The material position is set using the synchronizing pulse of the material position sensing. | Value 3000<br>Type I<br>Chart 180,1 |
| L203<br>S. Offset Set Value | Source for the value, which is subtracted from the setting value of the reference position (material position when passing the pass mark). The result of the subtraction operation can be used to enable synchronization shortly before reaching the pass mark. | Value 3006<br>Type I<br>Chart 180,6 |
| c204<br>Set Value RefePos | Actual setting value of the material position. The material position is set using the synchronization pulse of the material position sensing or per software (c208). | Type R<br>Chart 180,7 |
| L205<br>S. SV Dist. Light | Source for the distance between the light barrier and knife to calculate the material position when passing the light barrier <u>when activating cutting operation</u>. | Value 3123<br>Type I<br>Chart 180,1 |
| c207<br>Waiting For Web End | Indicates that the system is waiting for the end of the material web in the *End cut* operating mode. | Type BO<br>Chart 180,4 |
| c208<br>Set Ref. Position | Status of the control signal is to set the material position. | Type BO<br>Chart 180,6 |
| L209<br>S. Dist. PassMark | Source for the distance between the pass marks sensed by the light barrier and the knife. | Value 3099<br>Type I<br>Chart 180,6 |
| L210<br>S. SV_OM 1.Cut | Source for the control signal "Operating mode for the 1st cut". If this signal is '0', then a sheet is cut already at the 1st cut in accordance with the format specifications. | Value 0000<br>Type I<br>Chart 180,1 |
| L211<br>S. SV_enTopCut | Source for the control signal to enable the crop cut. When the crop cut is enabled, at the 1st cut a sheet with the crop length is cut. This allows a "clean" cut edge at the start of the material web. | Value 0511<br>Type I<br>Chart 180,2 |
| L212<br>S. no Cut Mode | Source for the control signal *No cutting operation* to generate a pulse to set the material position. | Value 0577<br>Type I<br>Chart 180,1 |
| L213<br>S. SV Light Gate | Source for the signal to identify the strip to set the material position.<br>Factory setting: Connected to terminal 65. | Value 0250<br>Type I<br>Chart 180,1 |
| L214<br>S. SV End Cut | Source for the signal to enable the end cut operating mode to set the material position. | Value 0573<br>Type I<br>Chart 180,1 |

| Parameter | Description | Data |
|---|---|---|
| L215<br>S. optRange1_max | Source for the upper range limit of the 1st range monitoring of the knife position. | Value 3001<br>Type I<br>Chart 350,1 |
| L216<br>S. optRange1 | Source for the knife position, 1st range monitoring of the knife position. | Value 3413<br>Type I<br>Chart 350,1 |
| L217<br>S. optRange1_min | Source for the lower range limit of the 1st range monitoring (knife position). | Value 3000<br>Type I<br>Chart 350,1 |
| c218<br>range1_OVF | Display, "Knife position has exceeded the upper range limit of the 1st range monitoring ". | Type BO<br>Chart 350,3 |
| c219<br>Range1_UF | Display, "Knife position has fallen below the lower range limit of the 1st range monitoring". | Type BO<br>Chart 350,3 |
| L220<br>S. Range3ShiftMax | Source for the offset quantity to offset the upper range limit of the 3rd range monitoring. (Example: Offset quantity can be the material velocity. The upper range limit is then offset dependent on the velocity.) | Value 3000<br>Type I<br>Chart 350,1 |
| L221<br>S. optRange3 | Source of the position actual value which is to be evaluated with the 3rd range monitoring.<br>Factory setting: Monitoring the knife position for linear systems. | Value 3413<br>Type I<br>Chart 350,1 |
| L222<br>S. Range3ShiftMin | Source to offset the lower range limit of the 3rd range monitoring. | Value 3000<br>Type I<br>Chart 350,1 |
| L223<br>Rng3_Factor_Max | Factor to evaluate the offset quantity L220. For positive values of L223, the upper range limit is reduced with increasing offset size. | Value 1.0<br>Type R<br>Chart 350,2 |
| L224<br>Range3_max | Upper range limit if the offset is not effective. | Value 1000 mm<br>Type R<br>Chart 350,2 |
| L225<br>Range3_Factor_Min | Factor to evaluate the offset quantity L222. For positive values of L225, the lower range limit is reduced with increasing offset quantity. | Value 0.0<br>Type R<br>Chart 350,2 |
| L226<br>Range3_min | Lower range limit for an offset, which is not effective. | Value 0.0 mm<br>Type R<br>Chart 350,2 |
| c227<br>Range3_OVF | Status of the 3rd range monitoring:<br>1: Monitored quantity has exceeded the upper range limit. | Type BO<br>Chart 350,4 |
| c228<br>Range3_UF | Status of the 3rd range monitoring:<br>1: Monitored quantity has exceeded the lower range limit. | Type BO<br>Chart 350,4 |
| L229<br>S. optRange2_max | Source for the upper range limit of the 2nd range monitoring. The material position is evaluated as standard. | Value 3162<br>Type I<br>Chart 350,5 |
| L230<br>S. optRange2 | Source for the position actual value of the 2nd range monitoring. | Value 3438<br>Type I<br>Chart 350,5 |
| L231<br>S. optRange2_min | Source for the lower range limit of the 2nd range monitoring. | Value 3163<br>Type I<br>Chart 350,5 |
| c232<br>Range2_OVF | Display, "Monitored position has exceeded the upper range limit of the 2nd range monitoring". | Type BO<br>Chart 350,7 |
| c233<br>Range2_UF | Display, "Monitored position has exceeded the lower range limit of the 2nd range monitoring". | Type<br>Chart 350,7 |
| c234<br>Out of Range3 | Status of the 3rd range monitoring:<br>1: Monitored quantity is outside the range limits. | Type BO<br>Chart 350,4 |
| L236<br>S. S RS-FlipFlop1 | Source for the setting signal of the free RS flip-flop 1. | Value 1277<br>Type I<br>Chart 430,1 |
| L237<br>S. R RS-FlipFlop1 | Source for the reset signal of the free RS flip-flop 1. | Value 0454<br>Type I<br>Chart 430,1 |

| Parameter | Description | Data |
|---|---|---|
| c241<br>Blocking nsetp | Absolute value of the speed setpoint for the knife blockage protection. | Type R<br>Chart 490,3 |
| c242<br>Blocking act Torque | Absolute value of the actual torque for the blockage protection of the knife. | Type R<br>Chart 490,3 |
| L243 ... L250<br>S. Logic1_I1 ...<br>S. Logic1_I8 | Sources for the digital input signals of the 1st parameterizable logic. | Type I<br>Chart 415,1 |
| L251 ... L254<br>Logic1_MS1 ...<br>Logic1_MS4 | Masks for 4 setting functions of the 1st parameterizable logic (refer to Chart 400). The inputs are selected using the bits of a mask which are set to '1'; the inputs are then ANDed. The low word of the mask selects the non-inverted- and the high word, the inverted inputs.<br>Example: Logic1_MS1 = 16#300F = 0011 0000 0000 1111b<br>⇒ AND logic operation: 1st setting condition = /I6 • /I5 • I4 • I3 • I2 • I1 | Type W<br>Chart 415,2 - 3 |
| L255 ... L257<br>Logic1_MR1 ...<br>Logic1_MR3 | Masks for 3 reset functions of the 1st parameterizable logic (evaluation, refer to L251 and Chart 400) | Type W<br>Chart 415,2 - 3 |
| L258<br>Logic1_MR | Mask to select the inputs, which reset the 1st parameterizable block. The low word of the mask selects the non-inverted- and the high word the inverted inputs (refer to L251). The selected inputs (or inverted inputs) are ORed. If the result of the OR logic operation is '1', then the outputs Q = '0', QN ='1'. The output Q then changes from '1' to '0', and a pulse is output at QEN. | Type W<br>Chart 415,3 |
| c259<br>Logic1_Q | Status output of the 1st parameterizable logic. The status is inverse to output QN. If the status changes, a pulse is generated at the outputs QE (QN: '0' ⇒ '1') and QEN (QN: '1' ⇒ '0') for the duration of a processing cycle. | Type BO<br>Chart 415,4 |
| L263 ... L270<br>S. Logic2_I1 ...<br>S. Logic2_I8 | Sources for the digital input signals of the 2nd parameterizable logic. | Type I<br>Chart 415,5 |
| L271 ... L274<br>Logic2_MS1 ...<br>Logic2_MS4 | Masks for 4 setting functions of the 2nd parameterizable logic (refer to Chart 400). The inputs, which are ANDed, are selected with the bits of a mask which are set to '1'. The low word of the mask selects the non-inverted- the high word, the inverted inputs.<br>Example: Logic2_MS1 = 16#300F = 0011 0000 0000 1111b<br>⇒ AND logic operation: 1st setting condition = /I6 • /I5 • I4 • I3 • I2 • I1 | Type W<br>Chart 415,6 - 7 |
| L275 ... L277<br>Logic2_MR1 ...<br>Logic2_MR3 | Masks for 3 reset functions of the 2nd parameterizable logic (evaluation, refer to L271 and Chart 400) | Type W<br>Chart 415,6 - 7 |
| L278<br>Logic2_MR | Mask to select the inputs, which reset the 2nd parameterizable block. The low word of the mask selects the non-inverted- and the high word the inverted inputs (refer to L271). The selected inputs (or inverted inputs) are ORed. If the result of the OR logic operation is '1', then the outputs Q = '0', QN ='1'. The output Q then changes from '1' to '0', and a pulse is output at QEN. | Type W<br>Chart 415,7 |
| c279<br>Logic2_Q | Status output of the 2nd parameterizable logic. The status is inverse to output QN. If the status changes, a pulse is generated at the outputs QE (QN: '0' ⇒ '1') and QEN (QN: '1' ⇒ '0') for the duration of a processing cycle. | Type BO<br>Chart 415,8 |
| L282<br>S. AbsPos high | Source for the high word of a 32-bit absolute value encoder value. Non-relevant bits (e.g. multi-turn positions) can be masked-out using L296. | Value 2314<br>Type I<br>Chart 160,1 |
| L283<br>S. AbsPos low | Source for the low word of a 16/32-bit absolute value encoder value. Non-relevant bits (e.g. multi-turn positions) can be masked-out using L297. | Value 2313<br>Type I<br>Chart 160,1 |
| L284<br>Abs. Pos. Norm. | Normalization value for the absolute position selected using L282, L283. In this case it involves the "Cuts per revolution" value. | Value 8192.0<br>Type R<br>Chart 160,4 |
| c285<br>Abs. Pos. CU | Absolute value encoder position (L282, L283) before normalization. The value 1.0 corresponds to the smallest encoder step (resolution). | Type R<br>Chart 160,3 |
| L286<br>AbsPos Limit | Range limit of the normalized absolute value encoder position. This is required to shift the range of the position (refer to c292; Chart 160). | Value 1.0<br>Type R<br>Chart 160,4 |

| Parameter | Description | Data |
|---|---|---|
| L287<br>AbsPos Range | Theoretical value range of the absolute value encoder position. The value is used to shift the range of the absolute position (refer to c292; Chart 160). | Value 1.0<br>Type R<br>Chart 160,5 |
| L288<br>AbsPos_AddPos | Offset to shift the range of the absolute position (refer to c292; Chart 160). | Value 0.0<br>Type R<br>Chart 160,4 |
| c290<br>AbsolutOffset | Offset position for the absolute value generator (from the CU or on T400). It involves the encoder position in the required zero position.<br>When a plant/system is first commissioned, the shears are positioned at the zero position and the absolute value position is saved as offset position in the NOVRAM of the T400. In cyclic operation, the saved offset position is subtracted from the measured value. | Type R<br>Chart 150,4 |
| c291<br>Abs.Pos. correct | Absolute position (from the 16/32-bit source) after subtracting the absolute value offset (c290). | Type R<br>Chart 150,4 |
| c292<br>Absolute Pos. 2 | Absolute position (from the 16/32-bit source) after normalization and range correction. The range correction is used to shift a discontinuous position (range overflow) of the encoder position from the operating range of the encoder. | Type R<br>Chart 160,6 |
| c293<br>Absole Pos. 1 | Absolute position (from the 16/32-bit source) after normalization. | Type R<br>Chart 160,4 |
| L294<br>S. Save pulse | Source of the signal to save the absolute position in the NOVRAM | Value 1311<br>Type I<br>Chart 150,2 |
| L295<br>S. AbsolutPos | Source of the position value from an absolute value encoder (not relevant for TR encoders). The value can be saved as zero offset in the NOVRAM. | Value 3292<br>Type I<br>Chart 150,2 |
| L296<br>Mask AbsPosHigh | Mask to select the valid bits of the high word of the 32-bit absolute position. All of the bits, selected with ‘1’ are evaluated. | Value 16#FFFF<br>Type W<br>Chart 160,2 |
| L297<br>Mask AbsPosLow | Mask to select the valid bits of the low word of the 16/32-bit absolute position. All of the bits, selected with ‘1’ are evaluated. | Value 16#FFFF<br>Type W<br>Chart 160,2 |
| L298<br>S. AbsPos Valid | Source of the signal, which signals the validity of the position value from the absolute value encoder. | Value 0976<br>Type I<br>Chart 150,2 |
| L300<br>S. Calib_Absolute | Source for the “Absolute position valid“ signal to reference the knife. | Value 0147<br>Type I<br>Chart 170,1 |
| L301<br>S. CoarseRef. Sel. | Source for the signal to enable the direction-dependent reference position. When this function is enabled, for a positive speed, L312 is set as reference position and for a negative speed, L311. | Value 0594<br>Type I<br>Chart 170,1 |
| L302<br>S. Calib_ZeroPuls | Source for the synchronizing pulse to reference the knife. | Value 0415<br>Type I<br>Chart 170,1 |
| L303<br>S. CalPhiOverflow | Source for the “Knife position has exceeded the permissible range“ signal. The signal is used to reset the status *Knife is calibrated*. | Value 0684<br>Type I4<br>Chart 170,1 |
| L304<br>S. CalPhiUnderflw | Source for the “Knife position has fallen below the permissible range“ signal. The signal is used to reset the status *Knife is calibrated*. | Value 0682<br>Type I<br>Chart 170,1 |
| L305<br>S. CalibCoarseRef | Source for the coarse reference pulse to set the knife position, when referencing, with the jogging function, to the coarse reference value. | Value 0529<br>Type I<br>Chart 170,4 |
| L306<br>S. CoarseRef_Jog | Source for the jogging signal in order to set the knife position to the coarse reference value when referencing. | Value 0593<br>Type I<br>Chart 170,4 |
| L307<br>S. Set Shear Pos2 | Source for an optional setting pulse to set the knife position. | Value 0000<br>Type I<br>Chart 170,6 |
| L308<br>S. Coarse Set Value | Source for the setting value of the knife position when referencing to the coarse reference value or when using an absolute value encoder (not for TR encoders). | Value 3183<br>Type I<br>Chart 170,6 |

| Parameter | Description | Data |
|---|---|---|
| L309<br>Calibrate Delay | Delay, which is effective when referencing the knife position after the position sensing of the absolute value encoder has been completed. | Value 0.0 ms<br>Type SD<br>Chart 170,2 |
| c310<br>Shear calibrated | Referencing status of the knife. | Type BO<br>Chart 170,5 |
| L311<br>Synchr.Pos. neg. | Setting value for the knife position for a negative knife speed. | Value 1.0<br>Type R<br>Chart 170,3 |
| L312<br>Synchr.Pos. pos. | Setting value for the knife position for a positive knife speed. | Value 0.0<br>Type R<br>Chart 170,3 |
| c313<br>Set Val Shear Pos | Actual setting value for the knife position. | Type R<br>Chart 170,7 |
| L314 ... L316<br>S. Enable Synchr1 ...<br>S. Enable Synchr3 | 3 alternative sources to enable the knife position synchronization. This means that synchronization is permitted as a function of the current operating mode. | Type I<br>Chart 120,1 |
| L317<br>CoarseRef pos. | Setting value for the knife position for the coarse referencing for a positive knife speed. | Value 0.0<br>Type R<br>Chart 170,3 |
| L318<br>CoarseRef neg. | Setting value for the knife position for the coarse referencing for a negative knife speed. | Value 1.0<br>Type R<br>Chart 170,3 |
| L319<br>S.SynchrShearPos | Source set value for the shear position at zero pulse (synchronization) | Value 3311<br>Type I<br>Chart 170,6 |
| L321, L322<br>S. OR4_1<br>S. OR4_2 | 2 sources for the inputs of OR-gate 4. | Type<br>Chart 425,7 |
| L323, L324<br>S. OR5_1<br>S. OR5_2 | 2 sources for the inputs of OR-gate 5. | Type<br>Chart 425,7 |
| L325, L326<br>S. NX_Cut Polygon<br>S. NY_Cut Polygon | Sources for the normalization factors for the cutting curve. | Value 3001<br>Type I<br>Chart 450,1-5 |
| L327<br>Set Cut Curve | Initiates a re-calculation of the cutting curve with a positive edge at L237. (set L327 = 0; L327 = 1) | Value 0<br>Type I<br>Chart 450,5 |
| L328<br>Typ Cut Curve | Order of the curve sections of the cutting curve.<br>0: 3rd order 2: 2nd order<br>1: 1st order (straight lines) 3: 3rd order (more rounded-off than for L508=0) | Value 1<br>Type I<br>Chart 450,6 |
| L329, L330<br>LM1 Cut Curve<br>LM2 Cut Curve | Mask to define linear curve elements bit-by-bit. LM1 involves the sections between points X1 and X16, LM2 the subsequent sections.<br>Example: LM1 = 0000 0000 0000 1001<br>➔ The point 1 and point 2 as well as 4 and 5 are connected through a straight line, independent of the selected curve type L328. | Value 0<br>Type I<br>Chart 450,6-7 |
| L331 ... L338<br>S. ModeSwitch_I1 ...<br>S. ModeSwitch_I8 | Sources for the digital input signal of the mode changeover. | Type I<br>Chart 410,2 |
| L339 ... L342<br>ModeSwitch_MS1 ...<br>ModeSwitch_MS4 | Masks for 4 setting functions of the mode changeover (refer to Chart 400). The inputs, which are ANDed, are selected using the bits of a mask which are set to ‘1’. The low word of the mask selects the non-inverted, the high word, the inverted inputs.<br>Example: ModeSwitch_MS1 = 16#300F = 0011 0000 0000 1111b<br>⇒ AND logic operation: 1st setting condition = /I6 • /I5 • I4 • I3 • I2 • I1 | Type W<br>Chart 410,3 - 4 |
| L343 ... L345<br>ModeSwitch_MR1 ...<br>ModeSwitch_MR3 | Masks for the 3 reset functions of the mode changeover (evaluation, refer to L339 and Chart 400) | Type W<br>Chart 410,3 - 4 |

| Parameter | Description | Data |
|---|---|---|
| L346<br>ModeSwitch_MR | Mask to select the inputs, which reset the mode changeover to synchronous operation (setpoint input from a format generator). The low word of the mask selects the non-inverted- and the high word the inverted inputs (refer to L339). The selected inputs (or inverted inputs) are ORed. If the result of the OR logic operation is '1', the outputs Q = '0', QN ='1'. Output Q then changes from '1' to '0', and a pulse is output at output QEN. | Type W<br>Chart 410,4 |
| c347<br>Mode Positioning | Status output, mode changeover:<br>0: Synchronous operation (format generator inputs the setpoint)<br>1: Positioning mode<br>The status is inverse to output QN. If the status changes, a pulse is output at the following outputs QE (QN: '0' ⇒ '1') and QEN (QN: '1' ⇒ '0') for the duration of one processing cycle. | Type BO<br>Chart 410,5 |
| c348<br>Error Mode Switch | Monitoring output of the enable of the positioning mode. An error is generated, if an illegal status occurs, selectable with L349, in the positioning mode. (e. g. if, for the current material position, synchronous operation should be active.) | Type BO<br>Chart 410,7 |
| L349<br>S. Mode Error | Source for the error condition, which may only have the value '1' when there is an error in the positioning mode. This is used to monitor the mode changeover. | Value 0454<br>Type I<br>Chart 410,6 |
| L350 ... L389<br>Friction_X1,<br>Friction_Y1 ...<br>Friction_X20,<br>Friction_Y20 | 20 value pairs to specify the friction characteristic.<br>Input values < X1 ⇒ output = Y1<br>Input values > X2 ⇒ output = Y2<br>The X values must be parameterized in an increasing sequence.<br>This means: friction_X(n) < friction_X(n+1) | Type R<br>Chart 460,2 - 4 |
| L390 ... L429<br>n_Cut_X1,<br>n_Cut_Y1 ...<br>n_Cut_X20,<br>n_Cut_Y20 | 20 value pairs to specify the cutting curve.<br>Input values < X1 ⇒ output = Y1<br>Input values > X2 ⇒ output = Y2<br>The X values must be parameterized in an increasing sequence.<br>This means: n_cut_X(n) < n_cut_X(n+1) | Type R<br>Chart 450,2 - 4 |
| L430 ... L469<br>Inertia_X1,<br>Inertia_Y1 ...<br>Inertia_X20,<br>Inertia_Y20 | 20 value pairs to specify the moment of inertia characteristic.<br>Input values < X1 ⇒ output = Y1<br>Input values > X2 ⇒ output = Y2<br>The X values must be parameterized in an increasing sequence.<br>This means: moment of inertia_X(n) < moment of inertia_X(n+1) | Type R<br>Chart 460,2 - 4 |
| L470 ... L489<br>P_X1,<br>KP_Y1 ...<br>KP_X10,<br>KP_Y10 | 20 value pairs to specify the characteristic for KP adaption (proportional gain of the speed controller in the basic drive converter).<br>Input values < X1 ⇒ output = Y1<br>Input values > X2 ⇒ output = Y2<br>The X values must be parameterized in an increasing sequence.<br>This means: KP_X(n) < KP_X(n+1) | Type R<br>Chart 450,2 - 4 |
| c490<br>KP_Diagr_Outp | Output of the characteristic for KP adaption. | Type R<br>Chart 450,5 |
| c491<br>Cut Polygon Outp | Output of the characteristic to specify the cutting curve. | Type R<br>Chart 450,6 |
| c492<br>Outp Friction Diag | Friction characteristic output. | Type R<br>Chart 460,5 |
| c493<br>Inertia Poly Out | Moment of inertia characteristic output (moment of inertia = $f$(knife position) ) | Type R<br>Chart 460,5 |
| c495<br>Inertia | Effective moment of inertia. | Type R<br>Chart 460,8 |
| L496<br>S. KP_Polygon | Source for the input quantity of the KP characteristic. | Value 3164<br>Type R<br>Chart 450,2 |
| L497<br>S. Cut Polygon | Source for the input quantity of the cutting curve. | Value 3413<br>Type R<br>Chart 450,1 |

| Parameter | Description | Data |
|---|---|---|
| L498<br>S. Friction Polyg. | Source for the input quantity of the friction characteristic. (This is connected as standard to the smoothed material velocity.) | Value 3023<br>Type R<br>Chart 460,1 |
| L499<br>S. Inertia Polygon | Source for the input quantity of the moment of inertia characteristic. (This is connected as standard with the knife position.) | Value 3413<br>Type R<br>Chart 460,1 |
| L500<br>S. Factor1 Friction | Source for the 1st evaluation factor of the friction characteristic (refer to Chart 460)<br>Friction torque = Output_friction characteristic • ( $f$(L502) + $f$(L500) • $f$(L501) ) | Value 3000<br>Type I<br>Chart 460,7 |
| L501<br>S. Factor2 Friction | Source for the 2nd evaluation factor of the friction characteristic (refer to Chart 460; L500). | Value 3001<br>Type I<br>Chart 460,7 |
| L502<br>S. Offset Friction | Source for the offset value to determine the friction (refer to Chart 460; L500). | Value 3000<br>Type I<br>Chart 460,7 |
| L503<br>S. Factor Inertia | Source for the evaluation factor of the moment of inertia characteristic (refer to Chart 460)<br>Moment of inertia = Output_characteristic • $f$(L503) + $f$(L504) | Value 3000<br>Type I<br>Chart 460,7 |
| L504<br>S. Offset Inertia | Source for the offset value to calculate the moment of inertia (refer to Chart 460; L503) | Value 3000<br>Type I<br>Chart 460,7 |
| L505, L506<br>S. NX_Friction<br>S. NY_Friction | Sources for the normalization factors of the friction characteristic. | Value 3001<br>Type I<br>Chart 460,1-5 |
| L507<br>Set Friction | Initiate re-calculation of the friction characteristic with a positive edge at L507. (set L507 = 0; L507 = 1) | Value 0<br>Type I<br>Chart 460,5 |
| L508<br>Typ Friction | Order of the curve segments of the friction characteristic.<br>0: 3rd order 2: 2nd order<br>1: 1st order (straight lines) 3: 3rd order (more rounded-off than for L508=0) | Value 1<br>Type I<br>Chart 460,6 |
| L509, L510<br>LM1 Friction<br>LM2 Friction | Mask to define the linear curve segments bit-by-bit. LM1 involves the segments between points X1 and X16, LM2, the subsequent segments.<br>Example: LM1 = 0000 0000 0000 1001<br>➔ The point 1 and point 2 as well as 4 and 5 are connected through a straight line, independent of the selected curve type L508. | Value 0<br>Type I<br>Chart 460,6 - 7 |
| L511, L512<br>S. NX_Inertia<br>S. NY_Inertia | Sources for the normalization factors of the moment of inertia characteristic. | Value 3001<br>Type I<br>Chart 460,1-5 |
| L513<br>Set Inertia | Initiate re-calculation of the moment of inertia characteristic with a positive edge at L507. (set L513 = 0; L513 = 1) | Value 0<br>Type I<br>Chart 460,5 |
| L514<br>Typ Inertia | Order of the curve segments of the moment of inertia characteristic.<br>0: 3rd order 2: 2nd order<br>1: 1st order (straight lines) 3: 3rd order (more rounded-off than for L508=0) | Value 1<br>Type I<br>Chart 460,6 |
| L515, L516<br>LM1 Inertia<br>LM2 Inertia | Mask to define the linear curve segments bit-by-bit. LM1 involves the segments between points X1 and X16, LM2, the subsequent segments.<br>Example: LM1 = 0000 0000 0000 1001<br>➔ The point 1 and point 2 as well as 4 and 5 are connected through a straight line, independent of the selected curve type L514. | Value 0<br>Type I<br>Chart 460,6 - 7 |
| L517<br>S. Ramp_Local | | Value 3533<br>Type<br>Chart 260,6 |
| L518<br>S. JogSpeed_neg | Source of the velocity for the *Jogging* mode. This value is negated, and can be used as velocity for jogging in the opposite direction. | Value 3519<br>Type I<br>Chart 260,2 |
| L519<br>JogSpeed | Fixed speed setpoint (normalized) for the *Jogging* mode. | Value 0.05<br>Type R<br>Chart 260,1 |
| L520 ... L522<br>S. JogPositiv1 ...<br>S. JogPositiv3 | 3 sources to enable the *Jogging* function for positive speeds. Purpose: Evaluating limit switches for linear systems. Enable signals, which are not used, must be connected to ‘1’ (connector 0001). | Type I<br>Chart 260,1 |

| Parameter | Description | Data |
|---|---|---|
| L523<br>S. JogSpeed1 | Source for the positive speed setpoint (normalized) for *Jogging*. | Value 3519<br>Type I<br>Chart 260,1 |
| L524 ... L526<br>S. JogNegativ1 ...<br>S. JogNegativ3 | 3 sources to enable the *Jogging* function for negative speeds. Purpose: Evaluating limit switches for linear systems. Enable signals, which are not used, must be connected to '1' (connector 0001). | Type I<br>Chart 260,1 |
| L527<br>S. JogSpeed2 | Source for the negative speed setpoint (normalized) for *Jogging*. | Value 3518<br>Type I<br>Chart 260,1 |
| L528<br>S.Jog1_Dir | Source to select the direction of rotation in the *Jogging1* mode.<br>0: Positive<br>1: Negative | Value 0594<br>Type I<br>Chart 260,3 |
| L529<br>S. Sel. Ref/Jog | Source to select the *Jogging1* or *Referencing* mode. Effect of the selected signal:<br>0: Jogging1<br>1: Referencing | Value 0592<br>Type I<br>Chart 260,5 |
| L530<br>S. LimSwitch Start | Source for the status of the lefthand limit switch for automatic referencing. Automatic in this case means that the direction is reversed when the limit switch is reached. | Value 0000<br>Type I<br>Chart 260,1 |
| L531<br>S. Limit Switch End | Source for the status of the righthand limit switch for automatic referencing. Automatic in this case means that the direction is reversed when the limit switch is reached. | Value 0001<br>Type I<br>Chart 260,1 |
| L532<br>S. Init_Ref_Dir | Source for the signal to define the initial status when automatically referencing. This means that it can be ensured, that the same direction of rotation is always used at the start of referencing. | Value 1312<br>Type I<br>Chart 260,1 |
| c533<br>Speed Local | Velocity setpoint for the local *Jogging1* or *Referencing* modes. | Type R<br>Chart 260,5 |
| L534<br>S. Sel_SpeedLocal | Source to select the knife velocity (refer to Chart 260); signal values<br>0: Speed setpoint from the cutting mode type<br>1: Speed setpoint from Jogging1 or Referencing | Value 0599<br>Type I<br>Chart 260,5 |
| L535<br>S. Sel_SpeedStart | Source to select the knife velocity (refer to Chart 260); signal values<br>0: Speed setpoint in accordance with L534<br>1: Speed setpoint for the *Approach starting position* mode | Value 0595<br>Type I<br>Chart 260,6 |
| L536<br>S. Speed Cut | Source for the reference speed (setpoint speed) in cutting operation. | Value 3021<br>Type I<br>Chart 260,5 |
| L537<br>S. Speed_Local | Source for the reference speed (setpoint speed) in the local mode. | Value 3533<br>Type I<br>Chart 260,5 |
| L538<br>S. SpeedPosCtrl | Source for the reference speed (setpoint speed) when approaching the starting position. | Value 3144<br>Type I<br>Chart 260,5 |
| L539<br>Tfilt n_setp | Smoothing time constant for the reference (setpoint) speed. | Value 1.2 ms<br>Type SD<br>Chart 260,7 |
| L540<br>StepsRampLocal | Ramp steps of a simple ramp function. In the factory setting the duration of the ramping is 5 · task cycle time T3 = 5· 12.8 ms = 64 ms. | Value 5<br>Type<br>Chart 260,7 |
| L541<br>S. Disable Spdsetp | Source of the control signal to inhibit the speed output. The speed setpoint can be set to zero using the signal. | Value 0000<br>Type I<br>Chart 260,7 |
| L542<br>Spd_Referencing | Speed setpoint (normalized) when referencing. For applications with linear axis, enter negative values in order to bring the knife in the direction of the quiescent position. | Value 0.05<br>Type R<br>Chart 260,2 |
| L543, L544<br>S. Not3, S. Not4 | Source for the 2 logical inverter. | Type I<br>Chart 430,6 |
| L545<br>S. TorqueFriction | Source of the friction torque to generate the torque sum for the drive converter. | Value 3029<br>Type I<br>Chart 240,6 |
| L546<br>S. Dif_inertia | Source of the moment of inertia for differentiating when calculating the oscillating torque. | Value 3495<br>Type I<br>Chart 240,1 |

| Parameter | Description | Data |
|---|---|---|
| L547<br>S. FactorT_accel | Source of the moment of inertia to calculate the accelerating torque. | Value 3495<br>Type I<br>Chart 240,1 |
| c548<br>Torque Setp > max | Result of the comparison between the setpoint (reference)- and maximum torque. If this quantity is 1, this means that the demanded torque cannot be provided (if the basic drive uses the same limit values). | Type BO<br>Chart 240,7 |
| c549<br>Torque Cut_Enable | Status of the cutting torque enable.<br>1: Cutting torque is entered as additional torque | Type BO<br>Chart 240,4 |
| L550<br>S. Cut Torque | Source for the cutting torque for the torque generation. | Value 3824<br>Type I<br>Chart 240,1 |
| L551<br>S. Cut Torque Pos | Source of the knife position for the cutting torque input. | Value 3413<br>Type I<br>Chart 240,1 |
| L552<br>S. Torque Cut Light | Source for the material identification (light barrier) for the cutting torque setpoint input. | Value 0250<br>Type I<br>Chart 240,1 |
| L553<br>S. n_Acceleration | Source of the speed setpoint to determine the accelerating torque. | Value 3021<br>Type I<br>Chart 240,1 |
| L554<br>S. Inertia | Source for the moment of inertia input to generate the effective mass moment of inertia. | Value 3493<br>Type I<br>Chart 460,7 |
| L555<br>S. Friction | Source for the friction torque input to generate the effective friction torque. | Value 3492<br>Type I<br>Chart 460,7 |
| L556<br>S. Vref_OscillTorque | Source of the velocity for the oscillating torque calculation. | Value 3435<br>Type I<br>Chart 240,1 |
| L557<br>S. Torque Cut Region | Source for the signal to enable the torque-component oscillating-, accelerating- and cutting torque. The effect of this enable signal:<br>0: Torques are set to 0<br>1: Torques, together with the friction torque, generate the reference torque | Value 0576<br>Type I<br>Chart 240,6 |
| L558<br>TD_Acceleration | Differentiating time constant to determine the accelerating torque. | Value 250 ms<br>Type SD<br>Chart 240,2 |
| L559<br>TD_Inertia | Differentiating time constant to determine the oscillating torque. | Value 500 ms<br>Type SD<br>Chart 240,2 |
| L560<br>S. F_Overspeed | Source for the supplementary velocity. The knife velocity is increased as percentage by the supplementary velocity connected (entered) here.<br>Example: Supplementary velocity = 0.05 ⇒ the knife speed is increased by 5% with respect to the material velocity when cutting. | Value 3000<br>Type I<br>Chart 265,1 |
| L561<br>S. Speed_vCut | Source for the velocity components from the cutting characteristic to take into account the over velocity factor. | Value 3491<br>Type I<br>Chart 265,1 |
| L562<br>S. Enable Cut Curve | Source for the control signal to enable the cutting curve. Control signal logic:<br>0: Setpoint velocity from the cutting curve = 0<br>1: Setpoint velocity from the cutting curve effective | Value 0576<br>Type I<br>Chart 265,6 |
| L563<br>S. Speed_Vref | Source for the reference velocity for the cutting curve. The supplementary setpoint obtained from this (parameter c577) is given by:<br>c577 = L573 · factor_overspeed · (1 - cutting curve) · reference velocity | Value 3435<br>Type I<br>Chart 265,5 |
| L564<br>S. Speed_DV_FGEN | Source for the velocity component of the setpoint generator. This is connected, as standard to the speed output of the format generator. | Value 3158<br>Type I<br>Chart 250,1 |
| L565<br>S. Speed_FOVS | Source for the overvelocity factor to evaluate the setpoint knife speed. This is connected as standard to the *Factor overspeed* (d020). | Value 3020<br>Type I<br>Chart 250,1 |

| Parameter | Description | Data |
|---|---|---|
| L566<br>S. Speed_PosCtrl | Source for the supplementary speed setpoint. This is connected, as standard to the position controller output. | Value 3144<br>Type I<br>Chart 250,1 |
| L567<br>S. Speed_Set_OVS | Source for the control signal to transfer the *Factor overspeed.* It is not permissible to change the factor while cutting.<br>1: Accept *Factor overspeed* | Value 0666<br>Type I<br>Chart 265,3 |
| L568<br>S. Cut Speed Limits | Source for the control signal to enable the setpoint speed in cutting operation. Control signal logic:<br>0: Setpoint speed = 0<br>1: Speed setpoint limiting according to L575, L576 | Value 0671<br>Type I<br>Chart 250,4 |
| L569<br>F_over_min | Lowest permissible value for the *Factor overspeed*. | Value 1.0<br>Type R<br>Chart 265,2 |
| L570<br>S. Speed_Vref | Source for the material velocity to determine the knife velocity setpoint. | Value 3435<br>Type I<br>Chart 250,1 |
| L571<br>Overspeed_Max | Optional weighting factor for the *Factor overspeed* (refer to Chart 265). This is also used as upper limit of the cutting velocity. | Value 1.0<br>Type R<br>Chart 265,2 |
| L572<br>n_Cut_min | Lower limit value of the cutting velocity. | Value 0.3<br>Type R<br>Chart 265,2 |
| L573<br>Factor Cut Curve | Constant weighting factor for the supplementary velocity, which is generated from the cutting curve. | Value 1.0<br>Type R<br>Chart 265,7 |
| L574<br>S. Max. Speed_Cut | Source of the maximum speed for cutting operation modes. | Value 3575<br>Type<br>Chart 250,5 |
| L575<br>Cut Speed_Max | Upper limit value of the velocity for cutting operation. | Value 1.1<br>Type R<br>Chart 250,4 |
| L576<br>Cut Speed_Min | Lower limit value of the velocity for cutting operation. | Value -0.1<br>Type R<br>Chart 250,4 |
| c577<br>v_setp Cut Curve | The velocity components resulting from the cutting curve and evaluation with *Factor overspeed*. | Type R<br>Chart 265,7 |
| L578<br>max_Torque Cut | Maximum positive torque (referred to the reference torque). This limit value is used to evaluate as to whether more torque is demanded than is actually available. It can also be transferred to the basic drive as torque limit (PZD7 in Chart 640). | Value 1.5<br>Type I<br>Chart 240,6 |
| L579<br>min_Torque Cut | Maximum negative torque (referred to the reference torque). This limit value can also be transferred to the basic drive as torque limit (PZD8 in Chart 640). | Value -1.5<br>Type I<br>Chart 240,6 |
| L580<br>TorqueMax_Local | Maximum torque (referred to the reference torque) for local operating modes. | Value 0.4<br>Type I<br>Chart 240,4 |
| c581<br>act. Max. Torque | Actual positive torque limit. | Type R<br>Chart 240,7 |
| c582<br>act. Min. Torque | Actual negative torque limit. | Type R<br>Chart 240,7 |
| L583<br>S.Speed_dVsetp | Source of the signal which is treated as supplementary speed component during the synchronous phase. | Value 3561<br>Type I<br>Chart 265,5 |
| L584<br>S. Reduced Torque | Source for the control signal to changeover to the torque limit, specified using L587. Using this control signal, for example, when cutting, the torque is limited to extremely low values while the cutting tool is clamped to the material. | Value 0000<br>Type I<br>Chart 240,5 |
| L585<br>S. Speed_dvCut | Source for a supplementary speed setpoint. This is assigned as standard to the speed generated from the cutting curve. | Value 3577<br>Type I<br>Chart 250,1 |
| L586<br>F_over_max | Highest permissible value for the *Factor overspeed* value. | Value 1.1<br>Type R<br>Chart 265,2 |

| Parameter | Description | Data |
|---|---|---|
| L587<br>Torque Reduced | Alternative torque limit value. The value can become effective while cutting with the control signal selected using L584. | Value 0.1<br>Type R<br>Chart 240,5 |
| L588 ... L590<br>S. Torquet_1 ...<br>S. Torquet_3 | Three sources for torque components, which should be effective in the cutting mode. | Type I<br>Chart 240,5 |
| L591<br>S. Compare3 | Source for the input signal of a comparator with hysteresis (free block). | Value 3000<br>Type I<br>Chart 350,6 |
| L592<br>S. Compare3 Mid | Center of the comparator range with hysteresis (free block). | Value 3000<br>Type I<br>Chart 350,6 |
| L593<br>S. Compare3 Range | Source for the range limit of the comparator with hysteresis (free block). | Value 3001<br>Type I<br>Chart 350,6 |
| L594<br>Compare3 Hyst. | Hysteresis of the comparator with hysteresis (free block). | Value 0.0<br>Type I<br>Chart 350,7 |
| L595<br>S. Compare 4 | Source for the input signal of a comparator with hysteresis (free block). | Value 3437<br>Type I<br>Chart 140,2 |
| L596<br>S. Compare 4 Mid | Center of the comparator range with hysteresis (free block). | Value 3204<br>Type I<br>Chart 140,2 |
| L597<br>S. Compare 4 Range | Source for the range limit of the comparator with hysteresis (free block). | Value 3366<br>Type I<br>Chart 140,2 |
| L598<br>Compare 4 Hyst. | Hysteresis of the comparator with hysteresis (free block). | Value 0.0<br>Type I<br>Chart 140,3 |
| L600<br>S.Task AENC_T400 | Source of the control signal to enable the absolute value encoder evaluation of a SSI- or EnDat encoder connected to the T400. As long as the control signal is ‘0’ then none of the functions, shown in Chart 150, are processed. | Value 0091<br>Type I<br>Chart 50,5 |
| L601<br>S.Task TR encoder | Source of the control signal to enable the absolute value generator evaluation of a TR encoder connected at the T400. As long as the control signal is ‘0’ then none of the functions, shown in Chart 165, are processed. | Value 0090<br>Type I<br>Chart 50,5 |
| L602<br>S.Task CU endocder | Source of the control signal to enable the absolute value generator evaluation of an encoder connected to the basic drive. As long as the control signal is ‘0’ then non of the functions, shown in Chart 160, are processed. | Value 0092<br>Type I<br>Chart 50,5 |
| L603<br>S.Task cut curve | Source of the control signal to enable processing of the cutting curve. As long as the control signal is ‘0’ the cutting curve is not processed. | Value 0168<br>Type I<br>Chart 50,4 |
| L605<br>S. DW_W_1 | Source for a double-word-word converter (free block) | Value 5000<br>Type I<br>Chart 440,4 |
| L606, L607<br>S. ADDI1 X1<br>S. ADDI1 X2 | Sources for the summands of the 1st integer adder. | Value 2000<br>Type I<br>Chart 445,1 |
| L608, L609<br>S. SUBI1 X1<br>S. SUBI1 X2 | Sources for the inputs of the 1st integer subtractor. | Value 2000<br>Type I<br>Chart 445,1 |
| C610<br>Task AENC | Status of the evaluation of an abs. value encoder at the T400 (SSI- or EnDat) 0: No processing<br>1: Processing software is active | Type BO<br>Chart 50,6 |
| C611<br>Task TR encoder | Status of the evaluation of a TR encoder at T400<br>0: No processing<br>1: Processing software is active | Type BO<br>Chart 50,6 |
| C612<br>Task CU encoder | Status of the evaluation of the absolute value encoder from the basic drive<br>0: No processing<br>1: Processing software is active | Type BO<br>Chart 50,6 |

| Parameter | Description | Data |
|---|---|---|
| C613<br>Task cut curve | Status of the processing of the cutting curve<br>0: The cutting curve is not processed (no supplementary speed setpoint)<br>1: Cutting curve processing is active | Type BO<br>Chart 50,6 |
| L614<br>Off delay cut | The cutting curve is processed, as standard, as long as the knife is within the cutting range. Processing can be extended for a defined period of time with delay L614. | Value 4.8 ms<br>Type SD<br>Chart 50,5 |
| L615 ... L616<br>S. MUL3 X1 ...<br>S. MUL3 X2 | Sources for the inputs of a free multiplier. | Value 3001<br>Type I<br>Chart 445,5 |
| L617 .. L619<br>S. SQRT_1 ...<br>S.SQRT_3 | 3 Source for the square root function to reduce the speed setpoint at the end of the travel. | Type<br>Chart 25,1 |
| L620<br>S. ON StateMach | Source for the starting signal for the automatic start-up sequence (commissioning sequence) of the simulation mode. The drive can be powered-up, referenced, the starting position approached and continuous cutting with a '1' at this signal. | Value 0000<br>Type I<br>Chart 810,1 |
| L621<br>S. CU ready SM | Source for the *Basic drive ready to power-up* signal in the simulation mode. | Value 0340<br>Type I<br>Chart 810,2 |
| L622<br>S. Web ready SM | Source for the *Feed drive ready to power-up* signal, if the feed drive is also to be activated in the simulation mode. | Value 0001<br>Type I<br>Chart 810,2 |
| L623<br>S. Fault SM | Source for the *Fault* signal in the simulation mode. | Value 0014<br>Type I<br>Chart 810,2 |
| L624<br>CTW1 CU=OFF | Value for control word 1 of the drive converter for the drive OFF status in the simulation mode. | Value 16#843E<br>Type W<br>Chart 810,4 |
| L625<br>CTW1 CU=ON | Value for the control word 1 of the drive converter for the drive ON status in the simulation mode. | Value 16#9C7F<br>Type W<br>Chart 810,5 |
| L626<br>S. CU run SM | Source for the *Basic drive operational* signal in the simulation mode. | Value 0342<br>Type I<br>Chart 810,1 |
| L627<br>S. Web run SM | Source for the *Material drive operational* signal in the simulation mode. | Value 0001<br>Type I<br>Chart 810,1 |
| L628<br>S. Calibrated SM | Source for the *Knife calibrated* signal in the simulation mode. | Value 1310<br>Type I<br>Chart 810,2 |
| L629<br>S. in Startpos SM | Source for the *Knife in the starting position* signal in the simulation mode. | Value 0647<br>Type I<br>Chart 810,2 |
| L630<br>SCTW1 OFF SM | Simulation value for the shears control word for the *No operation* operating mode. | Value 16#0000<br>Type I<br>Chart 810,2 |
| L631<br>SCTW1 Refer. SM | Simulation value for the shears control word for the *Calibrating* operating mode. | Value 16#0050<br>Type I<br>Chart 810,2 |
| L632<br>SCTW1 Startp. SM | Simulation value for the shears control word for the *Approach starting position* operating mode. | Value 16#0110<br>Type I<br>Chart 810,3 |
| L633<br>SCTW1 Cut SM | Simulation value for the shears control word for the *Continuous cutting* operating mode. | Value 16#0032<br>Type I<br>Chart 810,4 |
| L634<br>State Cut MS1 | Setting mask to activate the cutting mode for simulation. (Refer to the programmable logic STATE in Function Chart 400). | Value 16#0007<br>Type I<br>Chart 810,3 |
| L635<br>State Cut MR | Mask to exit the cutting mode for simulation. (Refer to the programmable logic STATE in Function Chart 400). | Value 16#0500<br>Type I<br>Chart 810,4 |

| Parameter | Description | Data |
|---|---|---|
| L636<br>MS1 SM on | Setting mask to activate the drives for simulation. (Refer to the programmable logic STATE in Function Chart 400). | Value 16#0017<br>Type I<br>Chart 810,3 |
| L637<br>MR SM off | Mask to power-down the drives for simulation. (Refer to the programmable logic STATE in Function Chart 400). | Value 16#1008<br>Type I<br>Chart 810,4 |
| L638<br>S. SCTW1bits SM | Source for the word-to-binary converter to split-up the simulated shears control word 1 into binary (digital) values. | Value 2622<br>Type I<br>Chart 810,6 |
| L639<br>S. CTW1bits SM | Source for the word-to-binary converter to split-up the simulated control word 1 into binary (digital) values. | Value 2621<br>Type I<br>Chart 810,6 |
| L640, L641<br>S. SwitchDI_0,<br>S. SwitchDI_1 | 2 sources for the inputs of the 32bit integer changeover switch. The output is selected with L642. | Type<br>Chart 430,6 |
| L642<br>S. SwitchDI_sel | Source for the signal to select the input at 32bit integer changeover switch.<br>0: Source(L640)<br>1: Source(L641) | Value 0000<br>Type<br>Chart 425,5 |
| L643<br>S. Cut Mode SM | Source of the state machine logic for standalone operation of the T400. In factory setting this input is used to distinguish between “cutting operation” and “approach start position” | Value 576<br>Type<br>Chart 810,2 |
| L644<br>StateCut MR1 | 2nd condition mask for terminating the cutting operation request of the state machine. | Value 16#0A00<br>Type<br>Chart 810,4 |
| L645<br>S. Edge2 | Source for the 2nd free edge function input. | Type<br>Chart 430,4 |
| L646<br>S. I_R_1 | Source for a free integer-to-real converter. | Value 2000<br>Type I<br>Chart 440,4 |
| L647<br>S. R_I_1 | Source for a free real-to-integer converter. | Value 3000<br>Type I<br>Chart 440,4 |
| L649<br>S.Reserve1 | Source for a reserve variable, which is normalized with *Xref_normalization*. | Value 3000<br>Type I<br>Chart 60,6 |
| L650 ... L665<br>Fixed value 1 ...<br>Fixed value 16 | 16 floating-point fixed values | Value 0.0<br>Type R<br>Chart 70,3 |
| L666 ... L670<br>Fixed value W1 ...<br>Fixed value W5 | 5 fixed values, word type (16 bit). When parameterizing using OP1S, word parameters are entered bit-by-bit. Word parameters can be connected to integer destinations. | Value 0<br>Type W<br>Chart 70,5 |
| L671 ... L678<br>Fixed value Int1 ...<br>Fixed value Int8 | 8 fixed values, integer type (16 bit). When parameterizing using OP1S, integer parameters are treated as signed, integer number. Integer parameters can be connected to word destinations. | Value 0<br>Type I<br>Chart 70,5 |
| L679 ... L684<br>Fixed value DI1 ...<br>Fixed value DI6 | 6 fixed values, double-integer type (32 bit). When parameterizing using OP1S, integer parameters are treated as signed, integer number. | Value 0<br>Type DI<br>Chart 70,7 |
| L685, L686<br>S. NOP1,<br>S. NOP2 | Sources for 2 floating-point values, which are to be distributed to several locations. The function can also be used to delay the transfer of a value, as it is processed in the slowest time sector. (time delay achieved: approx. 200 ms ... 500 ms) | Value 3000<br>Type I<br>Chart 430,1 |
| L687, L688<br>S. Bool_NOP1,<br>S. Bool_NOP2 | Sources for 2 digital values, which should be distributed at several locations. The function can also be used to delay the transfer of a value, as it is processed in the slowest time sector. (possible time delay: approx. 200 ms ... 500 ms) | Value 0000<br>Type I<br>Chart 430,3 |
| L689 ...L690<br>S. AND5_1 ...<br>S. AND5_2 | 2 sources for the inputs of the 5th free AND block. | Type<br>Chart 425,1 |
| L691 ...L692<br>S. AND6_1 ...<br>S. AND6_2 | 2 sources for the inputs of the 6th free AND block. | Type<br>Chart 425,3 |

| Parameter | Description | Data |
|---|---|---|
| L689 ...L690<br>S. AND7_1 ...<br>S. AND7_2 | 2 sources for the inputs of the 7th free AND block. | Type<br>Chart 425,5 |
| L695, L695<br>S. S RS-FlipFlop4,<br>S. R RS-FlipFlop4 | Sources for the set- and reset input of the 4th RS flip-flop (R dominant).<br>(free block). | Type<br>Chart 430,4 |
| L700 ... L702<br>S. AND1_I1 ...<br>S. AND1_I3 | 3 sources for the inputs of the 1st free AND block. | Type I<br>Chart 425,3 |
| L703 ... L705<br>S. AND2_I1 ...<br>S. AND2_I3 | 3 sources for the inputs of the 2nd free AND blocks. | Type I<br>Chart 425,3 |
| L706 , L707<br>S. Switch1_0 ...<br>S. Switch1_1 | 2 sources for the inputs of the 1st free changeover switch. The output is selected using L708. | Type I<br>Chart 430,1 |
| L708<br>S. Switch1_sel | Source for the signal to select the input at changeover switch 1.<br>0: Source(L706)<br>1: Source(L707) | Type I<br>Chart 430,1 |
| L709<br>S. Edge1 | Source for the 1st free edge detection block. | Value I<br>Chart 430,4 |
| L710 ... L712<br>S. OR1_I1 ...<br>S. OR1_I3 | 3 sources for the inputs of the 1st free OR logic block. | Type I<br>Chart 425,5 |
| L713 ... L715<br>S. OR2_I1 ...<br>S. OR2_I3 | 3 sources for the inputs of the 2nd free OR logic block. | Type I<br>Chart 425,5 |
| L716, L717<br>S. Switch2_0 ...<br>S. Switch2_1 | 2 sources for the inputs of the 2nd free changeover switch. The output is selected using L718. | Type I<br>Chart 430,3 |
| L718<br>S. Switch2_sel | Source for the signal to select the input at changeover switch 2.<br>0: Source(L716)<br>1: Source(L717) | Value 0000<br>Type I<br>Chart 430,3 |
| L720<br>S. Ramp Input | Source for the input signal of the ramp-function generator. | Value 3000<br>Type I<br>Chart 435,5 |
| L721, L722<br>S. Ramp max,<br>S. Ramp min | Source for the upper- and lower limit value of the ramp-function generator.<br>Factory setting: Limited to: 0.0 to 1.0 | Type I<br>Chart 435,6 |
| L723<br>S. Ramp Setvalue | Source for the setting value of the ramp-function generator. | Value 3000<br>Type I<br>Chart 435,5 |
| L724, L725<br>Ramp up time<br>Ramp down time | Ramp-up- and ramp-down times for the ramp-function generator. The times refer to a change of the output by a value 1.0. | Value 10000 ms<br>Type I<br>Chart 435,5-6 |
| L726<br>S. Ramp enable | Source for the control signal to enable the ramp-function generator. | Value 0000<br>Type I<br>Chart 435,5 |
| L727<br>S. Ramp set | Source for the control signal to set the ramp-function generator to the value in accordance with L723. | Value 0000<br>Type I<br>Chart 435,5 |
| L728<br>S. OnDelay1 | Source for the 1st switch-on delay. | Value 0000<br>Type I<br>Chart 436,1 |
| L729<br>T_OnDelay1 | 1st switch-on delay time. | Value 100 ms<br>Type SD<br>Chart 436,2 |
| L730<br>S. OffDelay1 | Source for the 1st switch-out delay. | Value 0000<br>Type I<br>Chart 436,1 |

| Parameter | Description | Data |
|---|---|---|
| L731<br>T_OffDelay1 | 1st switch-on delay time. | Value 100 ms<br>Type SD<br>Chart 436,2 |
| L732, L733<br>S. Not1, S. Not2 | Sources for the 2 logical inverters. | Type I<br>Chart 430,6 |
| L734, L735<br>S. S RS-FlipFlop2<br>S. R RS-FlipFlop2 | Sources for the set- and reset input of the 2nd RS flip-flop (R dominant).<br>(free block). | Value 0000<br>Type I<br>Chart 430,1 |
| L736, L737<br>S. S RS-FlipFlop3<br>S. R RS-FlipFlop3 | Sources for the set- and reset input of the 3rd RS flip-flop (R dominant).<br>(free block). | Value 0000<br>Type I<br>Chart 430,1 |
| L738<br>S. set_PT1_Zero | Source for the digital signal to set the output of the free lowpass filter to zero.<br>Behavior of the setting function:<br>Setting 0 →1: Output is immediately set to zero<br>Setting 1 →0: The output goes to the input value corresponding to L741 | Value 0000<br>Type I<br>Chart 436,7 |
| L739<br>Quality | Quality of the bandstop filter. Practical values lie in the range 1.0 ... 10.0. | Value 2.0<br>Type I<br>Chart 436,7 |
| L740<br>S. PT1_inp | Source of the input signal for a 1st order lowpass filter (free block). | Value 3000<br>Type I<br>Chart 436,7 |
| L741<br>Tfilt PT1 | Filter time constant of the 1st order lowpass filter. | Value 20 ms<br>Type SD<br>Chart 436,7 |
| L742<br>S. Bandstop_inp | Source of the input signal for a bandstop filter (free block). | Value 3000<br>Type I<br>Chart 436,7 |
| L743<br>S. StopFrequency | Source of the input signal for the blocking frequency (in Hz) of the bandstop filter. | Value 3002<br>Type I<br>Chart 436,7 |
| L744, L745<br>S. Compare_X,<br>S. Compare_Y | Sources for the input signals of a comparator. | Type I<br>Chart 435,6 |
| L746<br>S. Limit_max | Source for the upper limit of a free limiting block. | Value 3001<br>Type I<br>Chart 435,1 |
| L747<br>S. Limit_inp | Source for the signal to be limited of a free limiting block. | Value 3000<br>Type I<br>Chart 435,1 |
| L748<br>S. Limit_min | Source for the lower limit of a free limiting block. | Value 3000<br>Type I<br>Chart 435,1 |
| L749<br>S. Compare2 | Source for the input signal of a comparator with hysteresis (free block). | Value 3000<br>Type I<br>Chart 435,1 |
| L750<br>S. Compare2 Range | Source for the range limit of the comparator with hysteresis (free block). | Value 3001<br>Type I<br>Chart 435,1 |
| L751<br>Compare2 Hyst. | Hysteresis of the comparator with hysteresis (free block). | Value 0.1<br>Type I<br>Chart 435,2 |
| L752<br>S. Compare2 Mid | Center of the comparator range with hysteresis (free block). | Value 3006<br>Type I<br>Chart 435,1 |
| L753<br>S. Character_X | Source for the input signal of a characteristic with 2 points. The output = Y1 if the signal is less than X1; the output = Y2 if X2 is greater. A linear approximation is made between the two points. | Value 3000<br>Type I<br>Chart 435,1 |
| L754, L755<br>Character_X1,<br>Character_Y1 | Value pair for the lefthand characteristic point (smaller X coordinate). | Value 0.0<br>Type I<br>Chart 435,2 – 3 |

| Parameter | Description | Data |
|---|---|---|
| L756, L757<br>Character_X2,<br>Character_Y2 | Value pair for the righthand characteristic point (higher X coordinate). | Value 1.0<br>Type I<br>Chart 435,2 - 3 |
| L758<br>S. OffDelay2 | Source for the 2nd switch-off delay. | Value 0000<br>Type I<br>Chart 436,1 |
| L759<br>T_OffDelay2 | 2nd switch-off delay time. | Value 100 ms<br>Type SD<br>Chart 436,2 |
| L760<br>S. Free Word | Source for a 16-bit value, which is broken-down into individual bits (connectors 0760 to 0775) | Value 2061<br>Type I<br>Chart 440,1 |
| L761... L763<br>S. DW_high,<br>S. DW_low,<br>DW_Norm | 2 sources for a double word, which is converted into a floating-point value. L763 is the normalization; i. e. the output value for the input value 16#40000000. | Type I<br>Chart 440,5 - 7 |
| L764, L765<br>S. Word<br>Word_Norm | Source for a 16-bit value, which is to be converted into a floating-point value. L765 is the normalization; i. e. the output value for the input value 16#4000. | Type I<br>Chart 440,4 - 5 |
| L766, L767<br>S. Float<br>Float_Norm | Source for a floating-point value, which is converted into type N2. L767 is the normalization; i. e. the input value where the output = 16#4000. | Type I<br>Chart 440,6 - 7 |
| L768 ... L775<br>Testdata1_1<br>Testdata1_8 | 8, 16-bit test values for selection with L776. | Type I<br>Chart 800,2-3 |
| L776<br>S. Testdata1_Sel | Source to select one of 8, 16-bit test values (L768 ... L775). | Value 2000<br>Type I<br>Chart 800,3 |
| L777 ... L784<br>Testdata2_1<br>Testdata2_8 | 8, 16-bit test values for selection with L785. | Type I<br>Chart 800,2-3 |
| L785<br>S. Testdata2_Sel | Source to select one of 8, 16-bit test values (L777 ... L784). | Value 2000<br>Type I<br>Chart 800,3 |
| L786 ... L788<br>S. ADD1 X1 ...<br>S. ADD1 X3 | Source for the summands of a free adder. | Value 3000<br>Type I<br>Chart 445,3 |
| L789 ... L791<br>S. ADD2 X1 ...<br>S. ADD2 X3 | Source for the summands of a free adder. | Value 3000<br>Type I<br>Chart 445,3 |
| L792 ... L793<br>S. SUB1 X1 ...<br>S. SUB1 X2 | Source for the inputs of a free subtractor (X1 – X2). | Value 3000<br>Type I<br>Chart 445,3 |
| L794 ... L795<br>S. SUB2 X1 ...<br>S. SUB2 X2 | Source for the inputs of a free subtractor (X1 – X2). | Value 3000<br>Type I<br>Chart 445,3 |
| L796 ... L798<br>Q.MUL1 X1 ...<br>Q.MUL1 X3 | Source for the inputs of a free multiplier. | Value 3001<br>Type I<br>Chart 445,5 |
| L799 ... L801<br>S. MUL2 X1 ...<br>S. MUL2 X3 | Source for the inputs of a free multiplier. | Value 3001<br>Type I<br>Chart 445,5 |
| L802 ... L803<br>S. DIV1 X1 ...<br>S. DIV1 X2 | Source for the inputs of a free divider (X1 / X2). | Value 3001<br>Type I<br>Chart 445,5 |
| L804 ... L805<br>S. DIV2 X1 ...<br>S. DIV2 X2 | Source for the inputs of a free divider (X1 / X2). | Value 3001<br>Type I<br>Chart 445,5 |
| L806 ... L807<br>S. OR3_I1 ...<br>S. OR3_I2 | 2 sources for the inputs of the 3rd free OR block. | Type I<br>Chart 425,5 |

| Parameter | Description | Data |
|---|---|---|
| L808, L809<br>S. ADD3 X1,<br>S. ADD3 X2 | Source for the summands of a free adder. | Value 3000<br>Type<br>Chart 445,3 |
| L810<br>S. Free W_B_2 | Source for free word-to-binary converter. | Value 2000<br>Type I<br>Chart 440,1 |
| L811<br>S. R_DI | Source for free real-to-double integer converter. | Value 3000<br>Type<br>Chart 440,6 |
| L812 ... L813<br>S. DIVI1 X1 ...<br>S. DIVI1 X2 | Source for the inputs of a free integer divider (X1 / X2). | Value 2001<br>Type I<br>Chart 445,1 |
| L814 ... L815<br>S. MULI1 X1 ...<br>S. MULI1 X2 | Source for the inputs of a free integer multiplier. | Value 2001<br>Type I<br>Chart 445,1 |
| L816, L817<br>S. W_DW1 high<br>S. W_DW1 low | Source for a free word-to-double word converter. | Value 2000<br>Type I<br>Chart 440,4 |
| L818<br>S. Integrator_X | Source for the input quantity of the freely-available integrator. | Value 3000<br>Type I<br>Chart 435,5 |
| L819<br>Integrator LU | Upper limit value of the freely-available integrator | Value 1.0<br>Type R<br>Chart 435,6 |
| L820<br>Integrator LL | Lower limit value of the freely-available integrator | Value -1.0<br>Type R<br>Chart 435,6 |
| L821<br>S. Integrator SV | Source for the setting value of the freely-available integrator | Value 3000<br>Type R<br>Chart 435,5 |
| L822<br>Integrator T | Integration time constant of the freely-available integrator | Value 1000 ms<br>Type SD<br>Chart 435,5 |
| L823<br>S. Integrator set | Source for the setting signal of the freely-available integrator | Value 0000<br>Type I<br>Chart 435,5 |
| L824 , L825<br>S. Switch3_0 ...<br>S. Switch3_1 | 2 sources for the inputs of the 3rd free changeover switch. The output is selected using L826. | Type I<br>Chart 430,5 |
| L826<br>S. Switch3_sel | Source for the signal to select the input at changeover switch 3.<br>0: Source(L824)<br>1: Source(L825) | Value 0000<br>Type I<br>Chart 430,5 |
| L827, L828<br>S. Switch4_0 ...<br>S. Switch4_1 | 2 sources for the inputs of the 4th free changeover switch. The output is selected with L829. | Type I<br>Chart 430,7 |
| L829<br>S. Switch4_sel | Source for the signal to select the input at changeover switch 4.<br>0: Source(L827)<br>1: Source(L828) | Value 0000<br>Type I<br>Chart 430,7 |
| L830 ... .L832<br>S. AND_OR1_1 ...<br>S. AND_OR1_3 | Sources of the 1st AND-OR logic in Chart 425. B1830 is the output. | Type I<br>Chart 425,1 |
| L833 ... .L835<br>S. AND_OR2_1 ...<br>S. AND_OR2_3 | Sources of the 2nd AND-OR logic in Chart 425. B1833 is the output. | Type I<br>Chart 425,1 |
| L836 ... .L838<br>S. AND_OR3_1 ...<br>S. AND_OR3_3 | Sources of the 3rd AND-OR logic in Chart 425. B0836 is the output. | Type I<br>Chart 425,1 |
| L840<br>S. Cut Error | Source for the cutting error for statistical evaluation. | Value 3196<br>Type I<br>Chart 520,6 |

| Parameter | Description | Data |
|---|---|---|
| L841 ... L848<br>Statistic Limit1 ...<br>Statistic Limit8 | Eight limit values to statistically evaluate cutting errors. The evaluation determines the relative component of measured values, which lie between 2 adjacent limit values, or below the lowest, or above the highest limit.<br>For example: Output “Component LV3<LV4“ = 0.34 indicates that 34% of the measured values lie between StatisticLimit3 (inclusive) and StatisticLimit4 (exclusive). | Type R<br>Chart 520,6 |
| L849<br>Statistic Number<br>*Initialization par.* | Number of measured values determined via the error statistics. | Value 100<br>Type I<br>Chart 520,6 |
| L850<br>Statistic Absolut | Defines whether the cutting error statistic should use signed measured values or their absolute value.<br>0: Sign is taken into account<br>1: The absolute measured value is used | Value 1<br>Type BO<br>Chart 520,7 |
| c851 ... c859<br>Portion < Limit 1 ...<br>Portion > Limit 8 | Results of the cutting error statistics (referred to the number of measured values).<br>Portion < Limit1: Component of cuts more precise than the limit in L841<br>Portion LV1 .. LV2: Comp. between limit values in L841 and L842<br>Portion LV2 .. LV3: Comp. between limit values in L842 and L843<br>....<br>Portion > Limit8: Component of cuts less accurate than the limit in L848 | Type R<br>Chart 520,8 |
| L860<br>Logic3_MR | Mask to select the inputs, which reset the 3rd parameterizable block. The low word of the mask selects the non-inverted, and the high word, the inverted inputs (refer to L869). The selected inputs (or inverted inputs) are ORed. If the result of this OR logic operation is ‘1’, then outputs Q = ‘0’, QN =’1’. The output Q changes from ‘1’ to ‘0’ and a pulse is output at QEN. | Type W<br>Chart 420,3 |
| L861 ... L868<br>S. Logic3_I1 ...<br>S. Logic3_I8 | Sources for the digital input signals of the 3rd parameterizable logic. | Type I<br>Chart 420,1 |
| L869 ... L872<br>Logic3_MS1 ...<br>Logic3_MS4 | Mask for 4 setting functions of the 3rd parameterizable logic (refer to Chart 400). The inputs, which are ANDed with one another, are selected using the bits of a mask which are set to ‘1’. The low word of the mask selects the non-inverted, the high word the inverted input.<br>Example: Logic3_MS1 = 16#300F = 0011 0000 0000 1111b<br>⇒ AND logic operation: 1st setting condition = /I6 • /I5 • I4 • I3 • I2 • I1 | Type W<br>Chart 420,2 - 3 |
| L873 ... L875<br>Logic3_MR1 ...<br>Logic3_MR3 | Masks for 3 reset functions of the 3rd parameterizable logic (evaluation, refer to L869 and Chart 400) | Type W<br>Chart 420,2 - 3 |
| L876<br>S. Single Shot_1 | Source of the 1st free single shot function input. | Value 0000<br>Type<br>Chart 436,4 |
| L877<br>T_Single Shot_1 | Pulse duration of the 1st free single shot function. | Value 0 ms<br>Type<br>Chart 436,5 |
| L878<br>S. Single Shot_2 | Source of the 1st free single shot function input. | Value 0000<br>Type<br>Chart 436,4 |
| L879<br>T_Single Shot_1 | Pulse duration of the 2nd free single shot function. | Value 0 ms<br>Type<br>Chart 436,5 |
| L880<br>Logic4_MR | Mask to select the inputs, which reset the 4th parameterizable block (refer to L860). | Type W<br>Chart 420,7 |
| L881 ... L888<br>S. Logic4_I1 ...<br>S. Logic4_I8 | Sources for the digital input signals of the 4th parameterizable logic. | Type I<br>Chart 420,5 |
| L889 ... L892<br>Logic4_MS1 ...<br>Logic4_MS4 | Masks for 4 setting functions of the 4th parameterizable logic (refer to L869 and Chart 400). | Type W<br>Chart 420,6 - 7 |
| L893 ... L895<br>Logic4_MR1 ...<br>Logikc_MR3 | Masks for 3 reset functions of the 4th parameterizable logic (evaluation, refer to L869 and Chart 400) | Type W<br>Chart 420,6 - 7 |
| L986<br>S. Single Shot_3 | Source of the 3rd free single shot function input. | Value 0000<br>Type<br>Chart 436,4 |

| Parameter | Description | Data |
|---|---|---|
| L897<br>T_Single Shot_3 | Pulse duration of the 3rd free single shot function. | Value 0 ms<br>Type<br>Chart 436,5 |
| L898<br>S. OnDelay2 | Source for the 2nd switch-on delay. | Value 0000<br>Type<br>Chart 436,1 |
| L899<br>T_OnDelay2 | 2nd switch-on delay time. | Value 100 ms<br>Type<br>Chart 436,1 |
| L900<br>CB Address | Slave address of the communications module for operating T400 in the SRT400. | Value 3<br>Type I<br>Chart 750,3 |
| L901 ... L913<br>CB Param. 1 ...<br>CB Param. 13 | Parameter set for the communications module when operating the T400 in the SRT400. Refer to the Documentation of the communications module used for the significance of the individual parameters. A change only becomes effective after a 0→1 edge for L914. | Type I<br>Chart 750,3 – 5 |
| L914<br>CB Config set | If a parameter for the communications module is changed (L901ff), it becomes effective after a 0→1 edge for L914. | Type BO<br>Chart 750,3 |
| c915<br>CB Config State | Status of the configuration of the communications module. (0 = OK; 16#7CB3 configuration is not effective, as the drive converter is configuring the module.) | Type W<br>Chart 750,5 |
| L940 .. L947<br>S. Display R1 ...<br>S. Display R8 | Sources for the 8 monitoring parameters d040 ... d047, floating-point type. This allows connector values to be displayed, where no monitoring parameter is configured.<br>Source Display Source Display<br>L940 d040 L944 d044<br>L941 d041 L945 d045<br>L942 d042 L946 d046<br>L943 d043 L947 d047 | Type I<br>Chart 540,4 |
| L948 .. L951<br>S. Display W1 ...<br>S. Display W4 | Sources for the 8 monitoring parameters d048 ... d051, word type. This allows connector values to be displayed, where no monitoring parameter is configured.<br>Source Display Source Display<br>L948 d048 L950 d050<br>L949 d049 L951 d051 | Type I<br>Chart 540,4 |
| L956 .. L959<br>S. Display I1 ...<br>S. Display I4 | Sources for the 8 monitoring parameters d056 ... d059, integer type. This allows connector values to be displayed, where no monitoring parameter is configured.<br>Source Display Source Display<br>L956 d056 L958 d058<br>L957 d057 L959 d059 | Type I<br>Chart 540,6 |
| L964 .. L967<br>S. Display B1 ...<br>S. Display B4 | Sources for the 8 monitoring parameters d064 ... d067, BOOL type. This allows connector values to be displayed, where no monitoring parameter is configured.<br>Source Display Source Display<br>L964 d064 L966 d066<br>L965 d065 L967 d067 | Type I<br>Chart 540,6 |
| L968 .. L971<br>S. Display DI1 ...<br>S. Display DI4 | Sources for the 8 monitoring parameters d068 ... d071, double word type. This allows connector values to be displayed, where no monitoring parameter is configured.<br>Source Display Source Display<br>L968 d068 L970 d070<br>L969 d069 L971 d071 | Type I<br>Chart 540,6 |
| L990<br>USS Enable<br>*Initialization par.* | Enables the USS slave functionality to operate the T400 in the SRT400 with OP1S. Switch **S1/8** must be **simultaneously set to ON**. The activation/ deactivation only becomes effective after the module is reset. For USS operation, it is no longer possible to access via the RS232 interface. | Value 1<br>Type BO<br>Chart 770,1 |
| L991<br>USS Baud Rate | Baud rate of the USS interface. (OP1S can only operate with 9600 baud or 19200 baud). | Value 9600<br>Type DI<br>Chart 770,1 |
| L992<br>USS Address | Address of the USS interface. | Value 0<br>Type I<br>Chart 770,1 |

| Parameter | Description | Data |
|---|---|---|
| L993<br>USS 4-Wire | Difference between 2-conductor- (half duplex) and 4-conductor operation (full duplex) for the USS interface.<br><br><u>Value</u> <u>Significance</u> <u>Necessary for</u><br>0 RS485 2-conductor (half duplex) for OP1S<br>1 RS232 4-conductor (full duplex) for SIMOVIS<br><br>The end nodes at the USS bus (RS485) must terminate the bus with terminating resistors. Switches S1/1 and S1/2 on the T400 switch the appropriate resistors in the ON setting. | Value 0<br>Type I<br>Chart 770,1 |
| c994<br>USS Status | Receive-status word of the USS interface. (refer to SIMADYN D Communication Error Messages /3/ and CFC Online Help). This value is only of significance, if the T400 is operated without basic drive, and parameterization is to be realized via the serial interface 1 of the T400 in the USS protocol. | Type W<br>Chart 770,4 |
| c995 ... c996<br>PZD1 USS ...<br>PZD2 USS | Received process data of the USS interface. | Type W<br>Chart 770,6 |
| L997 ... L998<br>Q.PZD1 USS Slave ...<br>Q.PZD2 USS Slave | Sources for the two pieces of process data output at the USS interface. | Type I<br>Chart 770,6 |

# 6.3 Connectors

| TC | Chart | Path name | Significance |
|---|---|---|---|
| 0000 | 70,2 | Constant.FALSE.Q | Fixed value, logical 0 |
| 0001 | 70,2 | Constant.TRUE.Q | Fixed value, logical 1 |
| 0010 | 510,3 | input_CU.I5020.Q | System error |
| 0013 | 530,8 | Ctrl_Error.ST3895.Q | No fault |
| 0014 | 530,8 | Ctrl_Error.ST3890.Q | Fault |
| 0015 | 530,6 | Ctrl_Error.F4985.Q | Alarm |
| 0040 | 380,2 | RangeCheck.Cam.Q1 | Cam1_Q |
| 0041 | 380,2 | RangeCheck.Cam.QN1 | Cam1_QN |
| 0042 | 380,4 | RangeCheck.Cam.Q2 | Cam2_Q |
| 0043 | 380,4 | RangeCheck.Cam.QN2 | Cam2_QN |
| 0044 | 380,6 | RangeCheck.Cam.Q3 | Cam3_Q |
| 0045 | 380,6 | RangeCheck.Cam.QN3 | Cam3_QN |
| 0046 | 380,8 | RangeCheck.Cam.Q4 | Cam4_Q |
| 0047 | 380,8 | RangeCheck.Cam.QN4 | Cam4_QN |
| 0048 | 380,8 | RangeCheck.Cam.Q | Cam group output; COR function for cam1 ... cam4 |
| 0049 | 380,8 | RangeCheck.Cam.QN | Cam group inverted |
| 0068 | 780,5 | Peer.Receive.QTS | Peer receive, initialized |
| 0069 | 780,5 | Peer.Inv_Empfang.Q | Peer receive, not initialized |
| 0070 | 780,5 | Peer.Transmit.QTS | Peer send, initialized |
| 0071 | 780,5 | Peer.Inv_Senden.Q | Peer send, not initialized |
| 0078 | 780,7 | Peer.Peer_Timeout.Q | Peer timeout |
| 0079 | 780,7 | Peer.Peer_inv_Timeout.Q | Peer no timeout |
| 0090 | 50,8 | inpAbsolut.enable_TR.QE | Enable TR absolute value encoder |
| 0091 | 50,8 | inpAbsolut.SSI_local.QE | Enable T400 absolute value encoder |
| 0092 | 50,8 | inpAbsolut.SSI_CU_enab.QE | Enable CU absolute value encoder |
| 0093 | 50,8 | inpAbsolut.ModeAbsolut.Q | Enable absolute value encoder |
| 0094 | 480,8 | RangeCheck.SpeedVgl.QU | Shear speed > material speed |
| 0095 | 480,8 | RangeCheck.SpeedVgl.QM | Shear speed = material speed |
| 0096 | 480,8 | RangeCheck.SpeedVgl.QL | Shear speed < material speed |
| 0103 | 480,4 | Ctrl_Error.F4350.QU | Overspeed, positive |
| 0104 | 480,4 | Ctrl_Error.F4350.QL | Overspeed, negative |
| 0107 | 490,4 | Ctrl_Error.F4400.QM | n_act < block limit |
| 0109 | 490,5 | Ctrl_Error.F4440.QL | Torque < block torque |
| 0110 | 490,5 | Ctrl_Error.F4420.QL | \| n_set \| < n_block |
| 0111 | 490,5 | Ctrl_Error.F4420.QU | \| n_set \| > n_block |
| 0112 | 490,5 | Ctrl_Error.F4440.QU | Torque > block torque |
| 0116 | 490,7 | Ctrl_Error.F4460.Q | Knife is blocked |
| 0117 | 500,5 | Ctrl_Error.T1302.Q | Configuring error, pulse encoder |
| 0120 | 410,2 | Constant.Parameter_Bin.Q1 | Linear mode |
| 0121 | 500,5 | Ctrl_Error.F4571.QL | Speed deviation not too high |
| 0122 | 500,5 | Ctrl_Error.F4571.QU | Speed deviation too high |
| 0125 | 500,7 | Ctrl_Error.F4580.Q | Speed deviation, error |
| 0137 | 210,7 | PosControl.PosControl.QU | Position controller at its maximum |
| 0138 | 210,7 | PosControl.PosControl.QL | Position controller at its minimum |
| 0145 | 165,8 | inpAbsolut.TR3250.Q | TR encoder, load request |
| 0146 | 165,3 | inpAbsolut.TR3200.QN | TR encoder, not read-in |
| 0147 | 165,3 | inpAbsolut.TR3200.Q | TR encoder, read-in |
| 0148 | 165,8 | inpAbsolut.TR3400.Q | TR load input |
| 0149 | 165,8 | inpAbsolut.TR3350.Q | TR loading active |
| 0150 | 165,8 | inpAbsolut.TR3350.QN | TR loading not active |
| 0151 | 165,8 | inpAbsolut.TR3260.QP | TR reset knife position |
| 0154 | 165,6 | inpAbsolut.TR3520.Q | TR starting error |
| 0155 | 165,5 | inpAbsolut.TR3610.Q | TR timeout |
| 0156 | 165,6 | inpAbsolut.TR3570.Q | TR zero frequency |

| TC | Chart | Path name | Significance |
|---|---|---|---|
| 0157 | 165,7 | inpAbsolut.TR3690.Q | TR error |
| 0168 | 200,8 | PosControl.FormGen.QCR | FGEN in the cutting range |
| 0169 | 200,8 | PosControl.FormGen.QFR | FGEN in the format range |
| 0170 | 200,8 | PosControl.FormGen.QHL | Hardlock missing |
| 0171 | 200,8 | PosControl.FormGen.QF | FGEN error |
| 0172 | 200,4 | PosControl.P1010.Q | Enable format controller |
| 0178 | 150,8 | inpAbsolut.SSI_loc_err.Q | AENC error |
| 0179 | 150,8 | inpAbsolut.AENC_OK.Q | AENC OK (no error) |
| 0200 | 220,3 | Format.EnableFctrl.QP | Calculate format controller (pos. edge of edge detection) |
| 0201 | 220,3 | Format.EnableFctrl.QN | negative edge of edge detection |
| 0207 | 180,5 | Inc_Encoder.I1205.Q | End of material strip for end cut |
| 0208 | 180,7 | Inc_Encoder.I1210.Q | Set reference |
| 0218 | 350,3 | RangeCheck.Cut_Range.QU | Range1 exceeded |
| 0219 | 350,3 | RangeCheck.Cut_Range.QL | Range1 fallen below |
| 0227 | 350,4 | RangeCheck.KnifeRange.QU | Range3 exceeded |
| 0228 | 350,4 | RangeCheck.KnifeRange.QL | Range3 fallen below |
| 0232 | 350,8 | RangeCheck.Ref_Range.QU | Range2 exceeded |
| 0233 | 350,8 | RangeCheck.Ref_Range.QL | Range2 fallen below |
| 0234 | 350,4 | RangeCheck.PosOffRang.Q | Out of range3 |
| 0236 | 430,3 | RangeCheck.OptRSFF.Q | RSFF1_Q |
| 0237 | 430,3 | RangeCheck.OptRSFF.QN | RSFF1_QN |
| 0241 | 110,4 | input_T400.BIN.Q1 | BinInput 1 |
| 0242 | 110,4 | input_T400.BIN.Q2 | BinInput 2 |
| 0243 | 110,4 | input_T400.BIN.Q3 | BinInput 3 |
| 0244 | 110,4 | input_T400.BIN.Q4 | BinInput 4 |
| 0245 | 110,4 | input_T400.BIN.Q5 | BinInput 5 |
| 0246 | 110,4 | input_T400.BIN.Q6 | BinInput 6 |
| 0247 | 110,4 | input_T400.BIN.Q7 | BinInput 7 |
| 0248 | 110,4 | input_T400.BIN.Q8 | BinInput 8 |
| 0249 | 110,8 | input_T400.BQ3000.Q7 | Coarse pulse 1 |
| 0250 | 110,8 | input_T400.BQ3000.Q8 | Coarse pulse 2 |
| 0251 | 110,4 | input_T400.BIN.Q9 | BinInput 1 inverted |
| 0252 | 110,4 | input_T400.BIN.Q10 | BinInput 2 inv |
| 0253 | 110,4 | input_T400.BIN.Q11 | BinInput 3 inv |
| 0254 | 110,4 | input_T400.BIN.Q12 | BinInput 4 inv |
| 0255 | 110,4 | input_T400.BIN.Q13 | BinInput 5 inv |
| 0256 | 110,4 | input_T400.BIN.Q14 | BinInput 6 inv |
| 0257 | 110,4 | input_T400.BIN.Q15 | BinInput 7 inv |
| 0258 | 110,4 | input_T400.BIN.Q16 | BinInput 8 inv |
| 0259 | 110,8 | input_T400.Pin84_invers.Q | Coarse pulse 1 inv. |
| 0260 | 110,8 | input_T400.Pin65_invers.Q | Coarse pulse 2 inv. |
| 0261 | 100,4 | input_T400.BQ3000.Q1 | Terminal 46 |
| 0262 | 100,4 | input_T400.BQ3000.Q2 | Terminal 47 |
| 0263 | 100,8 | input_T400.BQ3000.Q3 | Terminal 48 |
| 0264 | 100,8 | input_T400.BQ3000.Q4 | Terminal 49 |
| 0265 | 100,4 | input_T400.Pin46_invers.Q | Terminal 46 inv. |
| 0266 | 100,4 | input_T400.Pin47_invers.Q | Terminal 47 inv. |
| 0267 | 100,8 | input_T400.Pin48_invers.Q | Terminal 48 inv. |
| 0268 | 100,8 | input_T400.Pin49_invers.Q | Terminal 49 inv. |
| 0298 | 150,4 | inpAbsolut.AbsPosValid.Q | Absolute position valid |
| 0300 | 620,4 | input_CU.CA3100_invers.Q1 | CU status1.0 inv |
| 0301 | 620,4 | input_CU.CA3100_invers.Q2 | CU status1.1 inv |
| 0302 | 620,4 | input_CU.CA3100_invers.Q3 | CU status1.2 inv |
| 0303 | 620,4 | input_CU.CA3100_invers.Q4 | CU status1.3 inv |
| 0304 | 620,4 | input_CU.CA3100_invers.Q5 | CU status1.4 inv |
| 0305 | 620,4 | input_CU.CA3100_invers.Q6 | CU status1.5 inv |

| TC | Chart | Path name | Significance |
|---|---|---|---|
| 0306 | 620,4 | input_CU.CA3100_invers.Q7 | CU status1.6 inv |
| 0307 | 620,4 | input_CU.CA3100_invers.Q8 | CU status1.7 inv |
| 0308 | 620,4 | input_CU.CA3100_invers.Q9 | CU status1.8 inv |
| 0309 | 620,4 | input_CU.CA3100_invers.Q10 | CU status1.9 inv |
| 0310 | 620,4 | input_CU.CA3100_invers.Q11 | CU status1.10 inv |
| 0311 | 620,4 | input_CU.CA3100_invers.Q12 | CU status1.11 inv |
| 0312 | 620,4 | input_CU.CA3100_invers.Q13 | CU status1.12 inv |
| 0313 | 620,4 | input_CU.CA3100_invers.Q14 | CU status1.13 inv |
| 0314 | 620,4 | input_CU.CA3100_invers.Q15 | CU status1.14 inv |
| 0315 | 620,4 | input_CU.CA3100_invers.Q16 | CU status1.15 inv |
| 0317 | 120,2 | Inc_Encoder.I1160.Q | Enable synchronization |
| 0320 | 620,8 | input_CU.CA3200_invers.Q1 | CU status2.0 inv |
| 0321 | 620,8 | input_CU.CA3200_invers.Q2 | CU status2.1 inv |
| 0322 | 620,8 | input_CU.CA3200_invers.Q3 | CU status2.2 inv |
| 0323 | 620,8 | input_CU.CA3200_invers.Q4 | CU status2.3 inv |
| 0324 | 620,8 | input_CU.CA3200_invers.Q5 | CU status2.4 inv |
| 0325 | 620,8 | input_CU.CA3200_invers.Q6 | CU status2.5 inv |
| 0326 | 620,8 | input_CU.CA3200_invers.Q7 | CU status2.6 inv |
| 0327 | 620,8 | input_CU.CA3200_invers.Q8 | CU status2.7 inv |
| 0328 | 620,8 | input_CU.CA3200_invers.Q9 | CU status2.8 inv |
| 0329 | 620,8 | input_CU.CA3200_invers.Q10 | CU status2.9 inv |
| 0330 | 620,8 | input_CU.CA3200_invers.Q11 | CU status2.10 inv |
| 0331 | 620,8 | input_CU.CA3200_invers.Q12 | CU status2.11 inv |
| 0332 | 620,8 | input_CU.CA3200_invers.Q13 | CU status2.12 inv |
| 0333 | 620,8 | input_CU.CA3200_invers.Q14 | CU status2.13 inv |
| 0334 | 620,8 | input_CU.CA3200_invers.Q15 | CU status2.14 inv |
| 0335 | 620,8 | input_CU.CA3200_invers.Q16 | CU status2.15 inv |
| 0336 | 170,7 | Inc_Encoder.SaveAnd1.Q | Storing of store value 1 (AND gate) |
| 0337 | 170,7 | Inc_Encoder.SaveAnd2.Q | Storing of store value 2 (AND gate) |
| 0340 | 620,4 | input_CU.CA3100.Q1 | CU status1.0 |
| 0341 | 620,4 | input_CU.CA3100.Q2 | CU status1.1 |
| 0342 | 620,4 | input_CU.CA3100.Q3 | CU status1.2 |
| 0343 | 620,4 | input_CU.CA3100.Q4 | CU status1.3 |
| 0344 | 620,4 | input_CU.CA3100.Q5 | CU status1.4 |
| 0345 | 620,4 | input_CU.CA3100.Q6 | CU status1.5 |
| 0346 | 620,4 | input_CU.CA3100.Q7 | CU status1.6 |
| 0347 | 620,4 | input_CU.CA3100.Q8 | CU status1.7 |
| 0348 | 620,4 | input_CU.CA3100.Q9 | CU status1.8 |
| 0349 | 620,4 | input_CU.CA3100.Q10 | CU status1.9 |
| 0350 | 620,4 | input_CU.CA3100.Q11 | CU status1.10 |
| 0351 | 620,4 | input_CU.CA3100.Q12 | CU status1.11 |
| 0352 | 620,4 | input_CU.CA3100.Q13 | CU status1.12 |
| 0353 | 620,4 | input_CU.CA3100.Q14 | CU status1.13 |
| 0354 | 620,4 | input_CU.CA3100.Q15 | CU status1.14 |
| 0355 | 620,4 | input_CU.CA3100.Q16 | CU status1.15 |
| 0360 | 620,8 | input_CU.CA3200.Q1 | CU status 2.0 |
| 0361 | 620,8 | input_CU.CA3200.Q2 | CU status 2.1 |
| 0362 | 620,8 | input_CU.CA3200.Q3 | CU status 2.2 |
| 0363 | 620,8 | input_CU.CA3200.Q4 | CU status 2.3 |
| 0364 | 620,8 | input_CU.CA3200.Q5 | CU status 2.4 |
| 0365 | 620,8 | input_CU.CA3200.Q6 | CU status 2.5 |
| 0366 | 620,8 | input_CU.CA3200.Q7 | CU status 2.6 |
| 0367 | 620,8 | input_CU.CA3200.Q8 | CU status 2.7 |
| 0368 | 620,8 | input_CU.CA3200.Q9 | CU status 2.8 |
| 0369 | 620,8 | input_CU.CA3200.Q10 | CU status 2.9 |
| 0370 | 620,8 | input_CU.CA3200.Q11 | CU status 2.10 |

| TC | Chart | Path name | Significance |
|---|---|---|---|
| 0371 | 620,8 | input_CU.CA3200.Q12 | CU status 2.11 |
| 0372 | 620,8 | input_CU.CA3200.Q13 | CU status 2.12 |
| 0373 | 620,8 | input_CU.CA3200.Q14 | CU status 2.13 |
| 0374 | 620,8 | input_CU.CA3200.Q15 | CU status 2.14 |
| 0375 | 620,8 | input_CU.CA3200.Q16 | CU status 2.15 |
| 0376 | 145,5 | Inc_Encoder.RefposControl.CUT | Cuttings pulse for manual cutting |
| 0377 | 145,5 | Inc_Encoder.RefposControl.CPR | Pulse correct reference position |
| 0378 | 145,5 | Inc_Encoder.RefposControl.SPR | Pulse to set reference position |
| 0379 | 145,5 | Inc_Encoder.RefposControl.SPS | Actual setpoint for the shear position is the starting position |
| 0380 | 145,5 | Inc_Encoder.RefposControl.CSP | Pulse at the beginning of the manual cutting pulse |
| 0410 | 120,6 | Inc_Encoder.MESSER.QFC | Encoder error1 |
| 0412 | 120,7 | Inc_Encoder.I1100.SN | Knife speed, negative |
| 0413 | 120,8 | Inc_Encoder.MESSER.SS | Position synchronized |
| 0414 | 120,7 | Inc_Encoder.not_SS_Geber1.Q | Position not synchronized |
| 0415 | 120,8 | Inc_Encoder.I1450.Q | Synch. position 32 ms pulse |
| 0416 | 120,8 | Inc_Encoder.CBT335.Q | Synch. position 100 ms pulse |
| 0417 | 120,7 | Inc_Encoder.MESSER.QPM | Maximum position exceeded |
| 0418 | 120,7 | Inc_Encoder.SyncOR.Q | Knife has synchronized or violated the max. position |
| 0419 | 120,7 | Inc_Encoder.MESSER.SYP | Synchronizing pulse, encoder1 (also w/o enable at SP) |
| 0420 | 130,8 | Inc_Encoder.LongPuls.Q | Long pulse (pulse extension for synchronizing pulses) |
| 0424 | 130,2 | Inc_Encoder.RefKorrAND.Q | Reference position correction pulse |
| 0431 | 130,5 | Inc_Encoder.MATERIAL.SYP | Synchronizing pulse, encoder2 (also w/o enable at SP) |
| 0432 | 130,5 | Inc_Encoder.MATERIAL.SS | Position2 with synchronizing pulse set |
| 0433 | 130,6 | Inc_Encoder.MATERIAL.QFC | Encoder error2 |
| 0434 | 130,6 | Inc_Encoder.MatSyncPuls.Q | Synchronizing pulse2 extended to 32 ms |
| 0435 | 130,8 | Inc_Encoder.VZ_VRef.QU | Material velocity > zero |
| 0436 | 130,8 | Inc_Encoder.VZ_VRef.QE | Material velocity = zero |
| 0437 | 130,8 | Inc_Encoder.VZ_VRef.QL | Material velocity < zero |
| 0442 | 135,7 | Ctrl_Error.F4600.QL | Reference error |
| 0443 | 135,7 | Ctrl_Error.F4610.QP | Reference error pulse |
| 0448 | 135,3 | Inc_Encoder.FirstMark.Q | Mark set (the first pass mark was detected) |
| 0449 | 135,3 | Inc_Encoder.FirstMark.QN | Mark not set (wait for the first pass mark) |
| 0453 | 330,5 | RangeCheck.I1410.Q | In the synchronous range |
| 0454 | 330,5 | RangeCheck.I1420.Q | In the format range |
| 0455 | 330,7 | RangeCheck.SynchrANDcut.Q | Cutting / synchronous |
| 0456 | 330,7 | RangeCheck.CutSynchron.Q | Enable cutting (in respect to speed and position) |
| 0459 | 330,3 | RangeCheck.I3100.QU | n_knife > 0 |
| 0460 | 330,3 | RangeCheck.I3100.QM | Knife stationary |
| 0464 | 330,8 | RangeCheck.I3120.QM | Knife in the change position |
| 0469 | 135,8 | Inc_Encoder.MarkCounter.Q0 | Pass mark counter equal to zero |
| 0470 | 135,8 | Inc_Encoder.MarkCounter.QU | Pass mark counter at its upper limit |
| 0471 | 135,8 | Inc_Encoder.MarkCounter.QL | Pass mark counter at its lower limit |
| 0490 | 330,8 | PosControl.Positionierung.QF | Knife in the change position |
| 0499 | 230,5 | PosControl.Positionierung.QP | PosRG; positioning being executed |
| 0500 | 270,8 | Ctrl_STW_Prio.ShearSTW1_int.Q1 | SCTW1.0 |
| 0501 | 270,8 | Ctrl_STW_Prio.ShearSTW1_int.Q2 | SCTW1.1 |
| 0502 | 270,8 | Ctrl_STW_Prio.ShearSTW1_int.Q3 | SCTW1.2 |
| 0503 | 270,8 | Ctrl_STW_Prio.ShearSTW1_int.Q4 | SCTW1.3 |
| 0504 | 270,8 | Ctrl_STW_Prio.ShearSTW1_int.Q5 | SCTW1.4 |
| 0505 | 270,8 | Ctrl_STW_Prio.ShearSTW1_int.Q6 | SCTW1.5 |
| 0506 | 270,8 | Ctrl_STW_Prio.ShearSTW1_int.Q7 | SCTW1.6 |
| 0507 | 270,8 | Ctrl_STW_Prio.ShearSTW1_int.Q8 | SCTW1.7 |
| 0508 | 270,8 | Ctrl_STW_Prio.ShearSTW1_int.Q9 | SCTW1.8 |
| 0509 | 270,8 | Ctrl_STW_Prio.ShearSTW1_int.Q10 | SCTW1.9 |
| 0510 | 270,8 | Ctrl_STW_Prio.ShearSTW1_int.Q11 | SCTW1.10 |
| 0511 | 270,8 | Ctrl_STW_Prio.ShearSTW1_int.Q12 | SCTW1.11 |

| TC | Chart | Path name | Significance |
|---|---|---|---|
| 0512 | 270,8 | Ctrl_STW_Prio.ShearSTW1_int.Q13 | SCTW1.12 |
| 0513 | 270,8 | Ctrl_STW_Prio.ShearSTW1_int.Q14 | SCTW1.13 |
| 0514 | 270,8 | Ctrl_STW_Prio.ShearSTW1_int.Q15 | SCTW1.14 |
| 0515 | 270,8 | Ctrl_STW_Prio.ShearSTW1_int.Q16 | SCTW1.15 |
| 0518 | 270,3 | Ctrl_STW_Prio.Hand_Auto.Q | Manual operation |
| 0519 | 270,6 | Ctrl_STW_Prio.Simulate.Q | Simulation mode |
| 0520 | 280,8 | Ctrl_STW_Prio.ShearSTW2_int.Q1 | SCTW2.0 |
| 0521 | 280,8 | Ctrl_STW_Prio.ShearSTW2_int.Q2 | SCTW2.1 |
| 0522 | 280,8 | Ctrl_STW_Prio.ShearSTW2_int.Q3 | SCTW2.2 |
| 0523 | 280,8 | Ctrl_STW_Prio.ShearSTW2_int.Q4 | SCTW2.3 |
| 0524 | 280,8 | Ctrl_STW_Prio.ShearSTW2_int.Q5 | SCTW2.4 |
| 0525 | 280,8 | Ctrl_STW_Prio.ShearSTW2_int.Q6 | SCTW2.5 |
| 0526 | 280,8 | Ctrl_STW_Prio.ShearSTW2_int.Q7 | SCTW2.6 |
| 0527 | 280,8 | Ctrl_STW_Prio.ShearSTW2_int.Q8 | SCTW2.7 |
| 0528 | 280,8 | Ctrl_STW_Prio.ShearSTW2_int.Q9 | SCTW2.8 |
| 0529 | 280,8 | Ctrl_STW_Prio.ShearSTW2_int.Q10 | SCTW2.9 |
| 0530 | 280,8 | Ctrl_STW_Prio.ShearSTW2_int.Q11 | SCTW2.10 |
| 0531 | 280,8 | Ctrl_STW_Prio.ShearSTW2_int.Q12 | SCTW2.11 |
| 0532 | 280,8 | Ctrl_STW_Prio.ShearSTW2_int.Q13 | SCTW2.12 |
| 0533 | 280,8 | Ctrl_STW_Prio.ShearSTW2_int.Q14 | SCTW2.13 |
| 0534 | 280,8 | Ctrl_STW_Prio.ShearSTW2_int.Q15 | SCTW2.14 |
| 0535 | 280,8 | Ctrl_STW_Prio.ShearSTW2_int.Q16 | SCTW2.15 |
| 0536 | 260,7 | Speed.Vlokal_Zero.QM | Speed_local = 0 |
| 0537 | 260,7 | Speed.Vlokal_not0.Q | Speed_local <> 0 |
| 0543 | 430,8 | Free_FBs.Not3.Q | Not3_Q; output negator (free block) |
| 0544 | 430,8 | Free_FBs.Not4.Q | Not4_Q; output negator (free block) |
| 0548 | 240,8 | Torque.M_gt_max.Q | M_set > M_max |
| 0549 | 240,4 | Torque.MC1020.Q | Cutting torque enable |
| 0554 | 520,3 | Enable.DelayCut.Q | Cutting pulse, extended to 32 ms |
| 0555 | 320,3 | Ctrl_STW_Prio.LGT_ST.Q | Material detection (light barrier OR control bit) |
| 0560 | 300,2 | Op_Modes.AND_Stop.Q | Output AND logic gate to exit cutting operation |
| 0561 | 300,5 | Op_Modes.CP3130.Q | Request continuous cut, cutting program |
| 0562 | 300,5 | Op_Modes.CP3300.Q0 | End of cut program 1 |
| 0563 | 300,5 | Op_Modes.CP3410.Q | Last cut, special sample |
| 0564 | 300,5 | Ctrl_STW_Prio.OR_Anford_cont.Q | Request continuous cutting |
| 0565 | 300,6 | Op_Modes.CN3500.Q | Program continuous cutting |
| 0566 | 300,6 | Op_Modes.CN3500.QN | No continuous cutting |
| 0567 | 300,6 | Op_Modes.FM3210.Q | Continuous cutting with sheet length |
| 0568 | 310,6 | Op_Modes.SP3500.Q | Program, single cut |
| 0569 | 310,6 | Op_Modes.SP3500.QN | No single cut |
| 0570 | 310,6 | Op_Modes.SG3500.Q | Program, sample cut |
| 0571 | 310,6 | Op_Modes.SG3500.QN | No sample cut |
| 0572 | 310,6 | Op_Modes.FM3200.Q | Sample with sheet length |
| 0573 | 320,7 | Op_Modes.TL3500.Q | Program, end cut |
| 0574 | 320,7 | Op_Modes.TL3500.QN | No end cut |
| 0575 | 300,7 | Op_Modes.FM3250.Q | Special length selected |
| 0576 | 320,4 | Enable.PR_M0.Q | Cutting operation active |
| 0577 | 320,4 | Enable.PR_MN.Q | No cutting operation |
| 0579 | 520,6 | Enable.CUT.Q | Cutting pulse for active cutting operation |
| 0580 | 320,4 | Enable.Edge_Cutmode.QP | Start of cutting operation |
| 0581 | 320,4 | Enable.Edge_Cutmode.QN | End of cutting operation |
| 0584 | 530,6 | Ctrl_Error.CA3130.Q | Acknowledge |
| 0590 | 210,3 | PosControl.R3002.Q | Approach start position OR knife change position |
| 0591 | 290,6 | Ctrl_STW_Prio.LOC_RQ.Q | Request local mode 1 |
| 0592 | 290,6 | Ctrl_STW_Prio.MODE.Q2 | Operating mode, calibrate |
| 0593 | 290,6 | Ctrl_STW_Prio.MODE.Q3 | Operating mode, jogging 1 |

| TC | Chart | Path name | Significance |
|---|---|---|---|
| 0594 | 290,6 | Ctrl_STW_Prio.MODE.Q4 | Operating mode, jogging 2 |
| 0595 | 290,7 | Ctrl_STW_Prio.MODE.Q5 | Operating mode, approach starting position |
| 0596 | 290,7 | Ctrl_STW_Prio.MODE.Q6 | Operating mode, knife change position. |
| 0597 | 290,7 | Ctrl_STW_Prio.NOTMOD.Q | No local operation requested |
| 0598 | 290,7 | Ctrl_STW_Prio.ReqLocalMode.Q | Local operation requested |
| 0599 | 290,8 | Ctrl_STW_Prio.CB3160.Q | Operating mode, local operation 2 |
| 0600 | 290,8 | Ctrl_STW_Prio.Not_BA_Lokal.Q | Not operating mode, local operation 2 |
| 0601 | 290,7 | Ctrl_STW_Prio.MOD_C.Q3 | Setting pulse, continuous cut |
| 0602 | 290,7 | Ctrl_STW_Prio.MOD_C.Q4 | Setting pulse, sample cut |
| 0603 | 290,7 | Ctrl_STW_Prio.MOD_C.Q5 | Setting pulse, single cut |
| 0604 | 290,7 | Ctrl_STW_Prio.MOD_C.Q6 | Select end cut |
| 0608 | 190,6 | Format.Set_FMT_Limit.Q | Dynamic format setpoint limitation active |
| 0609 | 810,2 | StateMachine.EIN_Input.Q | Status of the ON signal for test operation |
| 0610 | 810,7 | StateMachine.STW_Bits.Q1 | Bit0 of the control word 1 of test bit operation |
| 0611 | 810,7 | StateMachine.STW_Bits.Q2 | Bit1 of the control word 1 of test bit operation |
| 0612 | 810,7 | StateMachine.STW_Bits.Q3 | Bit2 of the control word 1 of test bit operation |
| 0613 | 810,7 | StateMachine.STW_Bits.Q4 | Bit3 of the control word 1 of test bit operation |
| 0614 | 810,7 | StateMachine.STW_Bits.Q5 | Bit4 of the control word 1 of test bit operation |
| 0615 | 810,7 | StateMachine.STW_Bits.Q6 | Bit5 of the control word 1 of test bit operation |
| 0616 | 810,7 | StateMachine.STW_Bits.Q7 | Bit6 of the control word 1 of test bit operation |
| 0617 | 810,7 | StateMachine.STW_Bits.Q8 | Bit7 of the control word 1 of test bit operation |
| 0618 | 810,7 | StateMachine.STW_Bits.Q9 | Bit8 of the control word 1 of test bit operation |
| 0619 | 810,7 | StateMachine.STW_Bits.Q10 | Bit9 of the control word 1 of test bit operation |
| 0620 | 810,7 | StateMachine.STW_Bits.Q11 | Bit10 of the control word 1 of test bit operation |
| 0621 | 810,7 | StateMachine.STW_Bits.Q12 | Bit11 of the control word 1 of test bit operation |
| 0622 | 810,7 | StateMachine.STW_Bits.Q13 | Bit12 of the control word 1 of test bit operation |
| 0623 | 810,7 | StateMachine.STW_Bits.Q14 | Bit13 of the control word 1 of test bit operation |
| 0624 | 810,7 | StateMachine.STW_Bits.Q15 | Bit14 of the control word 1 of test bit operation |
| 0625 | 810,7 | StateMachine.STW_Bits.Q16 | Bit15 of the control word 1 of test bit operation |
| 0626 | 810,2 | StateMachine.EIN_puls.QP | Pulse for a positive edge at connector 0609 |
| 0627 | 810,2 | StateMachine.EIN_puls.QN | Pulse for a negative edge at connector 0609 |
| 0628 | 810,4 | StateMachine.Startpos.Q | Output AND logic gate; refer to Chart 810 |
| 0629 | 810,5 | StateMachine.Cut.Q | Output logic for the test mode |
| 0630 | 810,5 | StateMachine.Cut.QN | 0629 inverted |
| 0631 | 425,4 | IncEncoder.AND3.Q | Output of the 3$^{rd}$ free AND logic gate |
| 0632 | 810,2 | StateMachine.Eichen.Q | Enable referencing for test operation |
| 0633 | 425,4 | IncEncoder.AND4.Q | Output of the 4$^{th}$ free AND logic gate |
| 0635 | 810,5 | StateMachine.WR_EIN.Q | Enable change ON for test operation |
| 0636 | 810,4 | StateMachine.WR_EIN.QN | Enable change ON inverse for test operation |
| 0640 | 340,4 | RangeCheck.ACALC.QU | Position > calculation position |
| 0641 | 340,4 | RangeCheck.ACALC.QL | Position < calculation position |
| 0644 | 340,4 | RangeCheck.SISTR.QM | In the starting position |
| 0645 | 430,5 | Free_FBs.Edge2.QP | Edge2_Q |
| 0646 | 430,5 | Free_FBs.Edge2.QP | Edge2_QN |
| 0647 | 340,7 | RangeCheck.SISTRT.Q | Knife is in the starting position |
| 0648 | 340,4 | RangeCheck.CALC.QN | Position fall below calc. Pos. |
| 0649 | 340,4 | RangeCheck.CALC.QP | Calculated position reached |
| 0660 | 360,5 | Enable.CD3720.Q | Drive converter ready |
| 0661 | 360,5 | Enable.WR_not_Ready.Q | Drive converter not ready |
| 0662 | 360,5 | Enable.CD3700.Q | Enable inverter |
| 0663 | 360,5 | Enable.CD3705.Q | No inverter enable |
| 0664 | 360,6 | Enable.CD3740.Q | Enable setpoint |
| 0665 | 360,6 | Enable.NoSetpoint.Q | No setpoint enable |
| 0666 | 360,7 | Enable.CD3750.Q | Controller enable |
| 0667 | 360,7 | Enable.CD3760.Q | No controller enable |
| 0670 | 370,5 | Enable.inv_PC_enable.Q | Position controller not enabled |

| TC | Chart | Path name | Significance |
|---|---|---|---|
| 0671 | 370,5 | Enable.CD3800.Q | Enable position controller |
| 0676 | 370,4 | Format.CD3370.Q | Open brake |
| 0680 | 370,4 | Format.CD3390.Q | Enable brake control |
| 0681 | 480,7 | Ctrl_Error.F4300.QL | Knife position, underflow |
| 0682 | 480,7 | Ctrl_Error.F4320.QP | Knife position, underflow pulse |
| 0683 | 480,7 | Ctrl_Error.F4500.QU | Knife position, overflow |
| 0684 | 480,7 | Ctrl_Error.F4520.QP | Knife position, overflow pulse |
| 0687 | 430,4 | Constant.Parameter_Bin.Q7 | Free binary connector |
| 0688 | 430,4 | Constant.Parameter_Bin.Q8 | Free binary connector |
| 0689 | 425,2 | Free_FBs.AND5.Q | Output 5th AND gate |
| 0691 | 425,4 | Free_FBs.AND6.Q | Output 6th AND gate |
| 0693 | 425,6 | Free_FBs.AND7.Q | Output 7th AND gate |
| 0694 | 470,3 | Ctrl_Error.F4110.Q | CB error |
| 0695 | 430,5 | Free_FBs.RS_FF4.Q | RSFF4_Q |
| 0696 | 430,5 | Free_FBs.RS_FF4.QN | RSFF4_QN |
| 0699 | 470,3 | Ctrl_Error.F4130.Q | CU error |
| 0700 | 425,4 | Free_FBs.AND1.Q | AND1_Q |
| 0701 | 340,4 | RangeCheck.Xref_Startlen.QU | Ref. Pos. > start length |
| 0702 | 340,4 | RangeCheck.Xref_Startlen.QL | Fef. Pos. < start length |
| 0703 | 425,4 | Free_FBs.AND2.Q | AND2_Q |
| 0704 | 470,8 | Ctrl_Error.F4230.Q | User error 1 |
| 0705 | 480,8 | Ctrl_Error.F4280.Q | User error 2 |
| 0708 | 430,6 | Free_FBs.Edge1.QN | Output positive edge detected (free block) |
| 0709 | 470,6 | Free_FBs.Edge1.QP | Output negative edge detected (free block) |
| 0710 | 425,6 | Free_FBs.OR1.Q | OR1_Q |
| 0713 | 425,6 | Free_FBs.OR2.Q | OR2_Q |
| 0720 | 435,8 | Free_FBs.RampGen.QU | Ramp-function generator at the upper limit value |
| 0721 | 435,8 | Free_FBs.RampGen.QL | Ramp-function generator at the lower limit value |
| 0722 | 435,6 | Free_FBs.RampGen.QE | Ramp Y=X |
| 0728 | 436,2 | Free_FBs.OnDelay1.Q | OnDelay1_Q; switch-in delayed signal |
| 0730 | 436,2 | Free_FBs.OffDelay1.Q | OffDelay1_Q; switch-out delayed signal |
| 0732 | 430,8 | Free_FBs.Not1.Q | Not1_Q; output negator (free block) |
| 0733 | 430,8 | Free_FBs.Not2.Q | Not2_Q; output negator (free block) |
| 0734 | 430,3 | Free_FBs.RS_FF1.Q | RSFF2_Q; Q output of an RS flip-flop |
| 0735 | 430,3 | Free_FBs.RS_FF1.QN | RSFF2_QN; QN output of an RS flip-flop |
| 0736 | 430,3 | Free_FBs.RS_FF3.Q | RSFF3_Q; Q output of an RS flip-flop |
| 0737 | 430,3 | Free_FBs.RS_FF3.QN | RSFF3_QN; QN output of an RS flip-flop |
| 0743 | 435,7 | Free_FBs.Compare.QE | Compare X = Y (output, free block) |
| 0744 | 435,7 | Free_FBs.Compare.QU | Compare X > Y |
| 0745 | 435,7 | Free_FBs.Compare.QL | Compare X < Y |
| 0746 | 430,3 | Free_FBs.Begrenzer.QU | Limiter at its upper limit (free block) |
| 0747 | 430,3 | Free_FBs.LimitOR.Q | Limiter at its limit (free block) |
| 0748 | 430,3 | Free_FBs.Begrenzer.QL | Limiter at its lower limit |
| 0749 | 435,3 | Free_FBs.Comp2.QU | Compare2 X > Y (output, comparator with hysteresis) |
| 0750 | 435,3 | Free_FBs.Comp2.QM | Compare2 X = Y (input in range) |
| 0751 | 435,3 | Free_FBs.Comp2.QL | Compare2 X < Y |
| 0758 | 436,2 | Free_FBs.OffDelay2.Q | Off Delay2_Q |
| 0760 | 440,3 | Free_FBs.Free_W_B_1.Q1 | Word to bit converter, bit 0 |
| 0761 | 440,3 | Free_FBs.Free_W_B_1.Q2 | Word to bit converter, bit 1 |
| 0762 | 440,3 | Free_FBs.Free_W_B_1.Q3 | Word to bit converter, bit 2 |
| 0763 | 440,3 | Free_FBs.Free_W_B_1.Q4 | Word to bit converter, bit 3 |
| 0764 | 440,3 | Free_FBs.Free_W_B_1.Q5 | Word to bit converter, bit 4 |
| 0765 | 440,3 | Free_FBs.Free_W_B_1.Q6 | Word to bit converter, bit 5 |
| 0766 | 440,3 | Free_FBs.Free_W_B_1.Q7 | Word to bit converter, bit 6 |
| 0767 | 440,3 | Free_FBs.Free_W_B_1.Q8 | Word to bit converter, bit 7 |
| 0768 | 440,3 | Free_FBs.Free_W_B_1.Q9 | Word to bit converter, bit 8 |

| TC | Chart | Path name | Significance |
|---|---|---|---|
| 0769 | 440,3 | Free_FBs.Free_W_B_1.Q10 | Word to bit converter, bit 9 |
| 0770 | 440,3 | Free_FBs.Free_W_B_1.Q11 | Word to bit converter, bit 10 |
| 0771 | 440,3 | Free_FBs.Free_W_B_1.Q12 | Word to bit converter, bit 11 |
| 0772 | 440,3 | Free_FBs.Free_W_B_1.Q13 | Word to bit converter, bit 12 |
| 0773 | 440,3 | Free_FBs.Free_W_B_1.Q14 | Word to bit converter, bit 13 |
| 0774 | 440,3 | Free_FBs.Free_W_B_1.Q15 | Word to bit converter, bit 14 |
| 0775 | 440,3 | Free_FBs.Free_W_B_1.Q16 | Word to bit converter, bit 15 |
| 0780 | 810,7 | StateMachine.SSTW_Bits.Q1 | Bit0 of the shears control word 1 of the test operation |
| 0781 | 810,7 | StateMachine.SSTW_Bits.Q2 | Bit1 of the shears control word 1 of the test operation |
| 0782 | 810,7 | StateMachine.SSTW_Bits.Q3 | Bit2 of the shears control word 1 of the test operation |
| 0783 | 810,7 | StateMachine.SSTW_Bits.Q4 | Bit3 of the shears control word 1 of the test operation |
| 0784 | 810,7 | StateMachine.SSTW_Bits.Q5 | Bit4 of the shears control word 1 of the test operation |
| 0785 | 810,7 | StateMachine.SSTW_Bits.Q6 | Bit5 of the shears control word 1 of the test operation |
| 0786 | 810,7 | StateMachine.SSTW_Bits.Q7 | Bit6 of the shears control word 1 of the test operation |
| 0787 | 810,7 | StateMachine.SSTW_Bits.Q8 | Bit7 of the shears control word 1 of the test operation |
| 0788 | 810,7 | StateMachine.SSTW_Bits.Q9 | Bit8 of the shears control word 1 of the test operation |
| 0789 | 810,7 | StateMachine.SSTW_Bits.Q10 | Bit9 of the shears control word 1 of the test operation |
| 0790 | 810,7 | StateMachine.SSTW_Bits.Q11 | Bit10 of the shears control word 1 of the test operation |
| 0791 | 810,7 | StateMachine.SSTW_Bits.Q12 | Bit11 of the shears control word 1 of the test operation |
| 0792 | 810,7 | StateMachine.SSTW_Bits.Q13 | Bit12 of the shears control word 1 of the test operation |
| 0793 | 810,7 | StateMachine.SSTW_Bits.Q14 | Bit13 of the shears control word 1 of the test operation |
| 0794 | 810,7 | StateMachine.SSTW_Bits.Q15 | Bit14 of the shears control word 1 of the test operation |
| 0795 | 810,7 | StateMachine.SSTW_Bits.Q16 | Bit15 of the shears control word 1 of the test operation |
| 0800 | 680,4 | input_CB.INV_SER1.Q1 | CB CTW1.0 inv |
| 0801 | 680,4 | input_CB.INV_SER1.Q2 | CB CTW1.1 inv |
| 0802 | 680,4 | input_CB.INV_SER1.Q3 | CB CTW1.2 inv |
| 0803 | 680,4 | input_CB.INV_SER1.Q4 | CB CTW1.3 inv |
| 0804 | 680,4 | input_CB.INV_SER1.Q5 | CB CTW1.4 inv |
| 0805 | 680,4 | input_CB.INV_SER1.Q6 | CB CTW1.5 inv |
| 0806 | 680,4 | input_CB.INV_SER1.Q7 | CB CTW1.6 inv |
| 0807 | 680,4 | input_CB.INV_SER1.Q8 | CB CTW1.7 inv |
| 0808 | 680,4 | input_CB.INV_SER1.Q9 | CB CTW1.8 inv |
| 0809 | 680,4 | input_CB.INV_SER1.Q10 | CB CTW1.9 inv |
| 0810 | 680,4 | input_CB.INV_SER1.Q11 | CB CTW1.10 inv |
| 0811 | 680,4 | input_CB.INV_SER1.Q12 | CB CTW1.11 inv |
| 0812 | 680,4 | input_CB.INV_SER1.Q13 | CB CTW1.12 inv |
| 0813 | 680,4 | input_CB.INV_SER1.Q14 | CB CTW1.13 inv |
| 0814 | 680,4 | input_CB.INV_SER1.Q15 | CB CTW1.14 inv |
| 0815 | 680,4 | input_CB.INV_SER1.Q16 | CB CTW1.15 inv |
| 0817 | 435,7 | Free_FBs.Integrator.QU | Free integrator at its upper limit |
| 0818 | 435,7 | Free_FBs.Integrator.QL | Free integrator at its lower limit |
| 0820 | 680,8 | input_CB.INV_SHEAR_CB.Q1 | CB CTW2.0 inv |
| 0821 | 680,8 | input_CB.INV_SHEAR_CB.Q2 | CB CTW2.1 inv |
| 0822 | 680,8 | input_CB.INV_SHEAR_CB.Q3 | CB CTW2.2 inv |
| 0823 | 680,8 | input_CB.INV_SHEAR_CB.Q4 | CB CTW2.3 inv |
| 0824 | 680,8 | input_CB.INV_SHEAR_CB.Q5 | CB CTW2.4 inv |
| 0825 | 680,8 | input_CB.INV_SHEAR_CB.Q6 | CB CTW2.5 inv |
| 0826 | 680,8 | input_CB.INV_SHEAR_CB.Q7 | CB CTW2.6 inv |
| 0827 | 680,8 | input_CB.INV_SHEAR_CB.Q8 | CB CTW2.7 inv |
| 0828 | 680,8 | input_CB.INV_SHEAR_CB.Q9 | CB CTW2.8 inv |
| 0829 | 680,8 | input_CB.INV_SHEAR_CB.Q10 | CB CTW2.9 inv |
| 0830 | 680,8 | input_CB.INV_SHEAR_CB.Q11 | CB CTW2.10 inv |
| 0831 | 680,8 | input_CB.INV_SHEAR_CB.Q12 | CB CTW2.11 inv |
| 0832 | 680,8 | input_CB.INV_SHEAR_CB.Q13 | CB CTW2.12 inv |
| 0833 | 680,8 | input_CB.INV_SHEAR_CB.Q14 | CB CTW2.13 inv |
| 0834 | 680,8 | input_CB.INV_SHEAR_CB.Q15 | CB CTW2.14 inv |

| TC | Chart | Path name | Significance |
|---|---|---|---|
| 0835 | 680,8 | input_CB.INV_SHEAR_CB.Q16 | CB CTW2.15 inv |
| 0836 | 425,3 | Free_FBs.andOR3.Q | Output 3rd AND-OR logic |
| 0837 | 425,2 | Free_FBs.ANDor3.Q | AND Output 3rd AND-OR logic |
| 0840 | 680,4 | input_CB.SER1.Q1 | CB control word1, bit 0 |
| 0841 | 680,4 | input_CB.SER1.Q2 | CB control word1, bit 1 |
| 0842 | 680,4 | input_CB.SER1.Q3 | CB control word1, bit 2 |
| 0843 | 680,4 | input_CB.SER1.Q4 | CB control word1, bit 3 |
| 0844 | 680,4 | input_CB.SER1.Q5 | CB control word1, bit 4 |
| 0845 | 680,4 | input_CB.SER1.Q6 | CB control word1, bit 5 |
| 0846 | 680,4 | input_CB.SER1.Q7 | CB control word1, bit 6 |
| 0847 | 680,4 | input_CB.SER1.Q8 | CB control word1, bit 7 |
| 0848 | 680,4 | input_CB.SER1.Q9 | CB control word1, bit 8 |
| 0849 | 680,4 | input_CB.SER1.Q10 | CB control word1, bit 9 |
| 0850 | 680,4 | input_CB.SER1.Q11 | CB control word1, bit 10 |
| 0851 | 680,4 | input_CB.SER1.Q12 | CB control word1, bit 11 |
| 0852 | 680,4 | input_CB.SER1.Q13 | CB control word1, bit 12 |
| 0853 | 680,4 | input_CB.SER1.Q14 | CB control word1, bit 13 |
| 0854 | 680,4 | input_CB.SER1.Q15 | CB control word1, bit 14 |
| 0855 | 680,4 | input_CB.SER1.Q16 | CB control word1, bit 15 |
| 0860 | 680,8 | input_CB.SHEAR_CB.Q1 | CB SCTW bit 0 |
| 0861 | 680,8 | input_CB.SHEAR_CB.Q2 | CB SCTW bit 1 |
| 0862 | 680,8 | input_CB.SHEAR_CB.Q3 | CB SCTW bit 2 |
| 0863 | 680,8 | input_CB.SHEAR_CB.Q4 | CB SCTW bit 3 |
| 0864 | 680,8 | input_CB.SHEAR_CB.Q5 | CB SCTW bit 4 |
| 0865 | 680,8 | input_CB.SHEAR_CB.Q6 | CB SCTW bit 5 |
| 0866 | 680,8 | input_CB.SHEAR_CB.Q7 | CB SCTW bit 6 |
| 0867 | 680,8 | input_CB.SHEAR_CB.Q8 | CB SCTW bit 7 |
| 0868 | 680,8 | input_CB.SHEAR_CB.Q9 | CB SCTW bit 8 |
| 0869 | 680,8 | input_CB.SHEAR_CB.Q10 | CB SCTW bit 9 |
| 0870 | 680,8 | input_CB.SHEAR_CB.Q11 | CB SCTW bit 10 |
| 0871 | 680,8 | input_CB.SHEAR_CB.Q12 | CB SCTW bit 11 |
| 0872 | 680,8 | input_CB.SHEAR_CB.Q13 | CB SCTW bit 12 |
| 0873 | 680,8 | input_CB.SHEAR_CB.Q14 | CB SCTW bit 13 |
| 0874 | 680,8 | input_CB.SHEAR_CB.Q15 | CB SCTW bit 14 |
| 0875 | 680,8 | input_CB.SHEAR_CB.Q16 | CB SCTW bit 15 |
| 0876 | 436,5 | Free_FBs.Impuls1.Q | Single Shot_1 |
| 0878 | 436,5 | Free_FBs.Impuls2.Q | Single Shot_2 |
| 0896 | 436,5 | Free_FBs.Impuls3.Q | Single Shot_3 |
| 0898 | 436,2 | Free_FBs.OnDelay2.Q | On Delay2_Q |
| 0918 | 660,7 | input_CB.no_Timeout_CB.Q | No timeout CB |
| 0919 | 660,4 | output.CB_TxD_Error.Q | CB send not initialized |
| 0920 | 660,4 | input_CB.CB_not_init.Q | CB receive not initialized |
| 0921 | 660,4 | input_CB.R3300.QTS | CB receive initialized |
| 0922 | 660,4 | output.SD3100.QTS | CB send initialized |
| 0924 | 660,7 | input_CB.CB_Timout_OR.Q | Timeout CB |
| 0933 | 421,3 | Ctrl_Linear.Logik_5.Q | Logic5_Q |
| 0934 | 421,3 | Ctrl_Linear.Logik_5.QN | Logic5_QN |
| 0935 | 421,3 | Ctrl_Linear.Logik_5.QE | Logic5_QE |
| 0936 | 421,3 | Ctrl_Linear.Logik_5.QEN | Logic5_QEN |
| 0941 | 421,6 | Ctrl_Linear.Logik_6.Q | Logic6_Q |
| 0942 | 421,6 | Ctrl_Linear.Logik_6.QN | Logic6_QN |
| 0943 | 421,6 | Ctrl_Linear.Logik_6.QE | Logic6_QE |
| 0944 | 421,6 | Ctrl_Linear.Logik_6.QEN | Logic6_QEN |
| 0971 | 600,5 | input_CU.R1000.QTS | CU receive initialized |
| 0972 | 600,5 | output.SD1200.QTS | CU send initialized |
| 0973 | 600,5 | input_CU.R1000.QT | CU timeout |

| TC | Chart | Path name | Significance |
|---|---|---|---|
| 0974 | 600,5 | input_CU.DRIVE.BS | CU operational |
| 0976 | 600,5 | input_CU.Resync_Delay.Q | CU operation delayed |
| 0977 | 600,4 | input_CU.I5060.Q | Resynchronization pulses |
| 0978 | 510,6 | Ctrl_State.ST5000.Q | Fan control |
| 0981 | 600,5 | input_CU.CU_not_CRV.Q | CU receive not initialized |
| 0982 | 600,5 | output.CU_inv_init.Q | CU send not initialized |
| 0983 | 600,5 | input_CU.CU_inv_Timeout.Q | No CU timeout |
| 0984 | 600,5 | input_CU.CU_inv_Betrieb.Q | CU not operational |
| 1257 | 415,4 | Ctrl_Linear.Knife_up.QEN | Logic1_QEN |
| 1258 | 415,4 | Ctrl_Linear.Knife_up.QE | Logic1_QE |
| 1259 | 415,4 | Ctrl_Linear.Knife_up.Q | Logic1_Q |
| 1260 | 415,4 | Ctrl_Linear.Knife_up.QN | Logic1_QN |
| 1277 | 415,8 | Ctrl_Linear.Knife_down.QEN | Logic2_QEN |
| 1278 | 415,8 | Ctrl_Linear.Knife_down.QE | Logic2_QE |
| 1279 | 415,8 | Ctrl_Linear.Knife_down.Q | Logic2_Q |
| 1280 | 415,8 | Ctrl_Linear.Knife_down.QN | Logic2_QN |
| 1300 | 170,3 | Inc_Encoder.Delay_AbsPosOK.Q | Set AbsPos valid |
| 1306 | 170,7 | Inc_Encoder.I1150.Q | Set knife position |
| 1307 | 170,7 | Inc_Encoder.CL1960.Q | Set to coarse ref. 32 ms |
| 1308 | 170,7 | Inc_Encoder.CL1990.QP | Set to coarse reference |
| 1309 | 170,5 | Inc_Encoder.CL3060.QN | Knife is not calibrated |
| 1310 | 170,5 | Inc_Encoder.CL3060.Q | Knife is calibrated |
| 1311 | 170,3 | Inc_Encoder.CL3045.QP | Calibration, starting pulse |
| 1312 | 170,3 | Inc_Encoder.CL3045.QN | Calibration, end pulse |
| 1313 | 170,5 | Inc_Encoder.Edge_Calibr.QP | Pulse when shear status changes to “calibrated” |
| 1314 | 170,5 | Inc_Encoder.Edge_Calibr.QN | Pulse when shear status changes to “not calibrated” |
| 1321 | 425,8 | Free_FBs.OR4.Q | Output 4$^{th}$ free OR gate |
| 1323 | 425,8 | Free_FBs.OR5.Q | Output 5$^{th}$ free OR gate |
| 1344 | 410,5 | Ctrl_Linear.enPosition.QEN | Starting pulse, synchronous operation |
| 1345 | 410,5 | Ctrl_Linear.enPosition.QE | Starting pulse, positioning operation |
| 1346 | 410,5 | Ctrl_Linear.enPosition.QN | Mode, synchronous operation |
| 1347 | 410,5 | Ctrl_Linear.enPosition.Q | Mode, positioning |
| 1348 | 410,7 | Ctrl_Linear.PosError.Q | Error for mode changeover |
| 1360 | 140,8 | Inc_Encoder.EnableSP_Ref.Q | Enable pass mark synchronization |
| 1363 | 140,6 | Inc_Encoder.FirstMarkRef.Q | Material position in the synchronizing range |
| 1591 | 350,8 | Free_FBs.Compare3.QU | Output, comparator 3: X > Y |
| 1592 | 350,8 | Free_FBs.Compare3.QM | Output, comparator 3: X in range |
| 1593 | 350,8 | Free_FBs.Compare3.QL | Output, comparator 3: X < Y |
| 1595 | 140,3 | Free_FBs.Compare4.QU | Output, comparator 4: X > Y |
| 1596 | 140,4 | Free_FBs.Compare4.QM | Output, comparator 4: X in range |
| 1597 | 140,3 | Free_FBs.Compare4.QL | Output, comparator 4: X < Y |
| 1806 | 425,6 | Free_FBs.OR3.Q | Output, 3$^{rd}$ free OR logic gate |
| 1810 | 440,3 | Free_FBs.Free_W_B_2.Q1 | FreeWord2_0 (outputs, word->binary converter) |
| 1811 | 440,3 | Free_FBs.Free_W_B_2.Q2 | FreeWord2_1 (outputs, word->binary converter) |
| 1812 | 440,3 | Free_FBs.Free_W_B_2.Q3 | FreeWord2_2 (outputs, word->binary converter) |
| 1813 | 440,3 | Free_FBs.Free_W_B_2.Q4 | FreeWord2_3 (outputs, word->binary converter) |
| 1814 | 440,3 | Free_FBs.Free_W_B_2.Q5 | FreeWord2_4 (outputs, word->binary converter) |
| 1815 | 440,3 | Free_FBs.Free_W_B_2.Q6 | FreeWord2_5 (outputs, word->binary converter) |
| 1816 | 440,3 | Free_FBs.Free_W_B_2.Q7 | FreeWord2_6 (outputs, word->binary converter) |
| 1817 | 440,3 | Free_FBs.Free_W_B_2.Q8 | FreeWord2_7 (outputs, word->binary converter) |
| 1818 | 440,3 | Free_FBs.Free_W_B_2.Q9 | FreeWord2_8 (outputs, word->binary converter) |
| 1819 | 440,3 | Free_FBs.Free_W_B_2.Q10 | FreeWord2_9 (outputs, word->binary converter) |
| 1820 | 440,3 | Free_FBs.Free_W_B_2.Q11 | FreeWord2_10 (outputs, word->binary converter) |
| 1821 | 440,3 | Free_FBs.Free_W_B_2.Q12 | FreeWord2_11 (outputs, word->binary converter) |
| 1822 | 440,3 | Free_FBs.Free_W_B_2.Q13 | FreeWord2_12 (outputs, word->binary converter) |
| 1823 | 440,3 | Free_FBs.Free_W_B_2.Q14 | FreeWord2_13 (outputs, word->binary converter) |

| TC | Chart | Path name | Significance |
|---|---|---|---|
| 1824 | 440,3 | Free_FBs.Free_W_B_2.Q15 | FreeWord2_14 (outputs, word->binary converter) |
| 1825 | 440,3 | Free_FBs.Free_W_B_2.Q16 | FreeWord2_15 (outputs, word->binary converter) |
| 1830 | 425,3 | Free_FBs.andOR1.Q | Output, 1st AND-OR logic |
| 1831 | 425,2 | Free_FBs.ANDor1.Q | AND Output, 1st AND-OR logic |
| 1833 | 425,3 | Free_FBs.andOR2.Q | Output, 2nd AND-OR logic |
| 1834 | 425,2 | Free_FBs.ANDor2.Q | AND Output, 2nd AND-OR logic |
| 1860 | 420,4 | Ctrl_Linear.Logic_3.Q | Output Q of the 3rd parameterizable logic |
| 1861 | 420,4 | Ctrl_Linear.Logic_3.QN | Output QN of the 3rd parameterizable logic |
| 1862 | 420,4 | Ctrl_Linear.Logic_3.QE | Output QE of the 3rd parameterizable logic |
| 1863 | 420,4 | Ctrl_Linear.Logic_3.QEN | Output QEN of the 3rd parameterizable logic |
| 1880 | 420,8 | Ctrl_Linear.Logic_4.Q | Output Q of the 4th parameterizable logic |
| 1881 | 420,8 | Ctrl_Linear.Logic_4.QN | Output QN of the 4th parameterizable logic |
| 1882 | 420,8 | Ctrl_Linear.Logic_4.QE | Output QE of the 4th parameterizable logic |
| 1883 | 420,8 | Ctrl_Linear.Logic_4.QEN | Output QEN of the 4th parameterizable logic |
| 2000 | 70,2 | Constant.Konst_W.Y1 | 0 (word) |
| 2001 | 70,2 | Constant.Konst_W.Y2 | 1 (word) |
| 2002 | 70,2 | Constant.SPS450_ID.Y3 | 2 (word) |
| 2003 | 70,2 | Constant.SPS450_ID.Y6 | 3 (word) |
| 2004 | 70,2 | Constant.SPS450_ID.Y7 | 4 (word) |
| 2005 | 70,2 | Constant.SPS450_ID.Y8 | 5 (word) |
| 2006 | 70,2 | Constant.Konst_W.Y3 | Constant 16#FFFF; corresponds to -1 |
| 2010 | 510,2 | input_CU.I5010.QS | System status word |
| 2012 | 630,4 | Ctrl_State.CE3200.QS | Control word 1 for the basic drive |
| 2013 | 630,8 | Ctrl_State.CE3500.QS | Control word 2 for the basic drive |
| 2014 | 530,8 | Ctrl_Error.F4960.Y | Error word |
| 2015 | 530,6 | Ctrl_Error.F4985.QS | Alarm word |
| 2016 | 510,7 | Ctrl_State.ST3900.QS | Control status |
| 2017 | 520,5 | Ctrl_State.CBT340.QS | Shears status |
| 2020 | 110,7 | input_T400.BI1030.QS | Status binary inputs (inverted and not inverted) |
| 2022 | 520,8 | Enable.CUT_count.Y | Cut counter |
| 2061 | 790,3 | Peer.RecPZD1.YWL | PZD1 receive for peer-to-peer |
| 2062 | 790,3 | Peer.RecPZD1.YWH | PZD2 receive for peer-to-peer |
| 2063 | 790,3 | Peer.RecPZD2.YWL | PZD3 receive for peer-to-peer |
| 2064 | 790,3 | Peer.RecPZD2.YWH | PZD4 receive for peer-to-peer |
| 2065 | 790,3 | Peer.RecPZD3.Y | PZD5 receive for peer-to-peer |
| 2155 | 200,8 | PosControl.FormGen.YFC | Error code of the format generator |
| 2301 | 610,3 | input_CU.R1020.Y1 | PZD1 from CU |
| 2302 | 610,3 | input_CU.R1020.Y2 | PZD2 from CU |
| 2303 | 610,3 | input_CU.R1020.Y3 | PZD3 from CU |
| 2304 | 610,3 | input_CU.R1020.Y4 | PZD4 from CU |
| 2305 | 610,3 | input_CU.R1020.Y5 | PZD5 from CU |
| 2306 | 610,3 | input_CU.R1020.Y6 | PZD6 from CU |
| 2307 | 610,3 | input_CU.R1020.Y7 | PZD7 from CU |
| 2308 | 610,3 | input_CU.R1020.Y8 | PZD8 from CU |
| 2309 | 610,3 | input_CU.R1021.Y1 | PZD9 from CU |
| 2310 | 610,3 | input_CU.R1021.Y2 | PZD10 from CU |
| 2311 | 610,3 | input_CU.R1021.Y3 | PZD11 from CU |
| 2312 | 610,3 | input_CU.R1021.Y4 | PZD12 from CU |
| 2313 | 610,3 | input_CU.R1021.Y5 | PZD13 from CU |
| 2314 | 610,3 | input_CU.R1021.Y6 | PZD14 from CU |
| 2315 | 610,3 | input_CU.R1021.Y7 | PZD15 from CU |
| 2316 | 610,3 | input_CU.R1021.Y8 | PZD16 from CU |
| 2357 | 620,2 | input_CU.CTW_STATES.Y1 | CU status word 1 |
| 2359 | 620,6 | input_CU.CTW_STATES.Y2 | CU status word 2 |
| 2400 | 120,4 | Constant.PulseMesser.Y | Pulse number 1 (knife encoder) |
| 2412 | 120,6 | Inc_Encoder.MESSER.YFC | Error code, knife position sensing |

| TC | Chart | Path name | Significance |
|---|---|---|---|
| 2420 | 130,2 | Constant.PulseRef.Y | Pulses, encoder 2 |
| 2434 | 130,6 | Inc_Encoder.MATERIAL.YFC | Error code 2 |
| 2465 | 135,8 | Inc_Encoder.MarkCounter.Y | Pass mark number |
| 2536 | 270,6 | Ctrl_STW_Prio.Simul_STW1.Y | Shears control word 1 |
| 2544 | 280,6 | Ctrl_STW_Prio.Simul_STW2.Y | Shears control word 2 |
| 2586 | 135,3 | Inc_Encoder.MarkLimit.Y | Mark limit (limit value for the pass mark counter) |
| 2588 | 135,3 | Inc_Encoder.Marken_I16.Y | Mark number – 1 (pass mark number calculated from the format) |
| 2605 | 440,5 | Free_FBs.DW_W1.YWH | DW_W1 high (output, double word->word converter) |
| 2606 | 440,5 | Free_FBs.DW_W1.YWL | DW_W1 low (output, double word->word converter) |
| 2607 | 445,2 | Free_FBs.ADDI_1.Y | ADDI_Y (output, integer adder 1) |
| 2608 | 445,2 | Free_FBs.SUBI_1.Y | SUBI_Y (output, integer subtractor 1) |
| 2621 | 810,6 | StateMachine.SW_STW1.Y | Control word1, test mode |
| 2622 | 810,5 | StateMachine.SSTW_Cut.Y | Shears control word 1, test mode |
| 2623 | 810,5 | StateMachine.SM_const..Y7 | Shears control word 2, test mode |
| 2647 | 440,5 | Free_FBs.R_I1.Y | R_I1 (output, floating-point -> integer converter) |
| 2666 | 70,6 | Constant.Konst_W.Y4 | Word, fixed value 1 |
| 2667 | 70,6 | Constant.Konst_W.Y5 | Word, fixed value 2 |
| 2668 | 70,6 | Constant.Konst_W.Y6 | Word, fixed value 3 |
| 2669 | 70,6 | Constant.Konst_W.Y7 | Word, fixed value 4 |
| 2670 | 70,6 | Constant.Konst_W.Y8 | Word, fixed value 5 |
| 2671 | 70,6 | Constant.Konst_I.Y1 | Integer, fixed value 1 |
| 2672 | 70,6 | Constant.Konst_I.Y2 | Integer, fixed value 2 |
| 2673 | 70,6 | Constant.Konst_I.Y3 | Integer, fixed value 3 |
| 2674 | 70,6 | Constant.Konst_I.Y4 | Integer, fixed value 4 |
| 2675 | 70,6 | Constant.Konst_I.Y5 | Integer, fixed value 5 |
| 2676 | 70,6 | Constant.Konst_I.Y6 | Integer, fixed value 6 |
| 2677 | 70,6 | Constant.Konst_I.Y7 | Integer, fixed value 7 |
| 2678 | 70,6 | Constant.Konst_I.Y8 | Integer, fixed value 8 |
| 2766 | 440,8 | Free_FBs.Float_N2.Y | Output float to N2 converter (free block) |
| 2776 | 800,5 | Constant.CW1_von_CB.Y | Test value 1 (for simulation, control word 1 from CB) |
| 2781 | 640,6 | output.Vsoll.Y | Setpoint 1 CU (N2) |
| 2785 | 800,5 | Constant.Scherensteuerw.Y | Test value 2 (for simulation, shears control word) |
| 2787 | 640,6 | output.M_soll.Y | Setpoint 2 CU (N2) |
| 2789 | 640,4 | output.Sollwert3_CU.Y | Setpoint 3 CU (N2) |
| 2792 | 640,4 | output.Sollwert4_CU.Y | Setpoint 4 CU (N2) |
| 2795 | 640,4 | output.Sollwert4_DW.YWH | Setpoint 5 high CU |
| 2796 | 640,4 | output.Sollwert4_DW.YWL | Setpoint 5 low CU |
| 2801 | 670,3 | input_CB.R3310_CB_virt.Y1 | PZD1 from CB |
| 2802 | 670,3 | input_CB.R3310_CB_virt.Y2 | PZD2 from CB |
| 2803 | 670,3 | input_CB.R3310_CB_virt.Y3 | PZD3 from CB |
| 2804 | 670,3 | input_CB.R3310_CB_virt.Y4 | PZD4 from CB |
| 2805 | 670,3 | input_CB.R3310_CB_virt.Y5 | PZD5 from CB |
| 2806 | 670,3 | input_CB.R3310_CB_virt.Y6 | PZD6 from CB |
| 2807 | 670,3 | input_CB.R3310_CB_virt.Y7 | PZD7 from CB |
| 2808 | 670,3 | input_CB.R3310_CB_virt.Y8 | PZD8 from CB |
| 2809 | 670,3 | input_CB.CB_virt_Rec.Y1 | PZD9 from CB |
| 2810 | 670,3 | input_CB.CB_virt_Rec.Y2 | PZD10 from CB |
| 2812 | 445,2 | Free_FBs.DIVI_1.Y | DIVI_1 Y (output, integer divider) |
| 2813 | 445,2 | Free_FBs.DIVI_1.MOD | DIVI_1 Y (MOD) (modulo output, integer divider) |
| 2814 | 445,2 | Free_FBs.MULI_1.Y | MULI_1 Y (output, integer multiplier) |
| 2826 | 700,3 | output.Istwert1_CB.Y | Actual value 1 CB |
| 2829 | 700,3 | output.Istwert2_CB.Y | Actual value 2 CB |
| 2832 | 700,3 | output.Istwert3_CB.Y | Actual value 3 CB |
| 2835 | 700,3 | output.Istwert4_CB.Y | Actual value 4 CB |
| 2838 | 700,4 | output.Istwert5_CB_DW.YWH | Actual value 5 CB high word |
| 2839 | 700,4 | output.Istwert5_CB_DW.YWL | Actual value 5 CB low word |

| TC | Chart | Path name | Significance |
|---|---|---|---|
| 2843 | 680,3 | input_CU.STW1CU_sel.Y | CB CTW1 control word2 from the COMBOARD |
| 2845 | 680,5 | input_CU.CTW_STATES.Y3 | CB shearsCTW; shears control word from COMBOARD |
| 2846 | 690,4 | Ctrl_State.CBT300.QS | Status word 1 for COMBOARD |
| 2847 | 690,8 | Ctrl_State.CBT320.QS | Status word 2 for COMBOARD |
| 2968 | 530,5 | Ctrl_Error.F4900.QS | Error bits |
| 2994 | 770,4 | USS-Slave.USS_Receive.YTS | USS status |
| 2995 | 770,7 | USS-Slave.USS_PZD.Y1 | PZD1 USS, receive |
| 2996 | 770,7 | USS-Slave.USS_PZD.Y2 | PZD2 USS, receive |
| 3000 | 70,2 | Constant.Zahlen_Const.Y1 | 0.0 |
| 3001 | 70,2 | Constant.Zahlen_Const.Y2 | 1.0 |
| 3002 | 70,2 | Constant.Zahlen_Const.Y3 | 2.0 |
| 3003 | 70,2 | Constant.Zahlen_Const.Y4 | PI |
| 3004 | 70,2 | Constant.Zahlen_Const.Y5 | 2 PI |
| 3005 | 70,2 | Constant.Zahlen_Const.Y6 | PI / 2 |
| 3006 | 70,2 | Constant.Zahlen_Const.Y7 | 0.5 |
| 3007 | 70,2 | Constant.Zahlen_Const.Y8 | -1.0 |
| 3020 | 265,5 | Speed.FFACTS.Y | Factor, overspeed |
| 3021 | 250,7 | Speed.R1260.Y | n_set cut |
| 3023 | 260,8 | Speed.R1290.Y | Speed setpoint n_set |
| 3025 | 240,7 | Torque.M1420.Y | Reference (setpoint) torque |
| 3026 | 240,4 | Torque.MJ1150.Y | Accelerating torque |
| 3027 | 240,4 | Torque.MA1350.Y | Oscillating torque |
| 3028 | 240,5 | Torque.MC1030.Y | Cutting torque |
| 3029 | 460,7 | Torque.FPosControl.Y | Frictional torque |
| 3038 | 380,2 | RangeCheck.DX_CamPos.Y | Cam_dx |
| 3040 | 380,2 | RangeCheck.NFV_Knife_norm.Y | Speed norm for cams = f(knife position) |
| 3041 | 380,2 | RangeCheck.NFV_Fsymech.Y | Speed norm for cams = f(norm. knife position) |
| 3042 | 380,2 | RangeCheck.NFV_mm_s.Y | Speed norm for cams = f(reference position) |
| 3043 | 380,2 | RangeCheck.NFV_Fsymech.Y | Speed norm for cams = f(norm. reference position) |
| 3050 | 80,2 | Constant.UproFsymec.Y | Revolutions/Fsymech |
| 3061 | 790,3 | Peer.RecPZD1.YR | Peer: PZD2 and PZD3 as floating-point value |
| 3063 | 790,3 | Peer.RecPZD2.YR | Peer: PZD5 and PZD5 as floating-point value |
| 3091 | 60,4 | Constant.AngleConst.Y1 | AX |
| 3092 | 60,4 | Constant.AngleConst.Y2 | AY |
| 3094 | 180, 7 | Inc_Encoder.DX_Setval.Y | Setting value, pass mark |
| 3095 | 60,4 | Constant.LXLGTnorm.Y | Distance, light barrier normalized |
| 3096 | 60,4 | Constant.Norm_EntfernungS.Y | Distance, cut normalized |
| 3097 | 60,4 | Constant.NormSchopflaeng.Y | Crop length, normalized |
| 3098 | 60,4 | Constant.LF_norm.Y | Long Format, normalized |
| 3099 | 60,4 | Constant.LXLGnorm.Y | Light barrier + distance to the cut (normalized) |
| 3100 | 60,4 | Constant.Zahlen_Const.Y8 | Angular normalization |
| 3101 | 60,2 | Constant.KONST1.Y1 | Fixed value AX |
| 3102 | 60,2 | Constant.KONST1.Y2 | Fixed value AY |
| 3103 | 60,7 | Constant.KONST3.Y2 | Fixed value AZ |
| 3104 | 80,4 | Constant.KONST2.Y1 | V_reference |
| 3105 | 60,6 | Constant.KONST2.Y6 | Fsymech |
| 3106 | 60,3 | Constant.KONST2.Y4 | Distance, light barrier - knife |
| 3107 | 60,3 | Constant.KONST2.Y5 | Distance to the cut |
| 3108 | 60,7 | Constant.COS_Epsilon.Y | Cosine epsilon |
| 3109 | 60,4 | Constant.KONST1.Y8 | Knife change position |
| 3110 | 60,2 | Constant.KONST2.Y2 | TopCut size |
| 3111 | 60,2 | Constant.KONST2.Y3 | Long Format |
| 3112 | 60,7 | Constant.KONST1.Y4 | Starting angle, M cut input |
| 3113 | 60,7 | Constant.KONST1.Y5 | Final angle, M cut input |
| 3114 | 60,7 | Constant.RefNorm.Y | Normalization factor for the material position |
| 3115 | 80,3 | Constant.MessradKorr.Y | Circumference of the measuring wheel |

| TC | Chart | Path name | Significance |
|---|---|---|---|
| 3116 | 80,3 | Constant.KONST2.Y8 | Gearbox factor, measuring wheel |
| 3117 | 80,2 | Constant.KONST3.Y1 | Feed/revolution |
| 3118 | 60,4 | Constant.Norm_AX.Y | Angle, end of cut, normalized |
| 3119 | 60,4 | Constant.Norm_AY.Y | Angle, start of cut, normalized |
| 3122 | 60,7 | Constant.KONST3.Y7 | Distance, material detetction to knife |
| 3123 | 60,7 | Constant.NormAbstdMat.Y | Distance, material detetction to knife (normalized) |
| 3129 | 60,4 | Constant.Norm_MWP.Y | Knife change position, normalized |
| 3132 | 210,6 | PosControl.PosControl.YE | System deviation, PC |
| 3143 | 210,7 | PosControl.PosControl.Y | Output, position controller |
| 3144 | 210,8 | PosControl.R1160.Y | Output, PC smoothed |
| 3145 | 210,6 | PosControl.PosControl.YI | Integral component, PC |
| 3157 | 200,8 | PosControl.FormGen.YDS | FGEN Xset |
| 3158 | 200,8 | PosControl.FormGen.YDV | FGEN Vset |
| 3159 | 200,8 | PosControl.FormGen.SIN | FGEN sin*sin |
| 3160 | 200,8 | PosControl.FormGen.FEL | Format, electrical |
| 3161 | 200,8 | PosControl.FormGen.PST | Starting position |
| 3162 | 200,8 | PosControl.FormGen.LST | Starting length |
| 3163 | 200,8 | PosControl.FormGen.YAR | AREF for AZ |
| 3164 | 200,8 | PosControl.FormGen.AM1 | Acceleration, phase 1 |
| 3165 | 200,8 | PosControl.FormGen.AM2 | Acceleration, phase 2 |
| 3166 | 200,8 | PosControl.FormGen.DG1 | Diagnostics output 1 |
| 3167 | 200,8 | PosControl.FormGen.DG2 | Diagnostics output 2 |
| 3168 | 200,8 | PosControl.StartLenKorr.Y | Start length + offset |
| 3175 | 220,3 | Format.P3140.Y | Next setpoint format |
| 3180 | 150,7 | inpAbsolut.Absolutgebe.YP | AENC position normalized |
| 3181 | 150,7 | inpAbsolut.Absolutgebe.YSP | AENC speed |
| 3182 | 150,7 | inpAbsolut.Absolutgebe.Y | AENC position with revolutions (multi-turn encoder) |
| 3183 | 150,8 | inpAbsolut.AbsNorm.Y | Position of the absolute value encoder, normalized |
| 3184 | 220,7 | Format.P1070.Y | Output, format controller |
| 3185 | 220,3 | Format.ErrAdd.Y | Cutting error |
| 3192 | 265,6 | Speed.R1050.Y | Supplementary angle, cutting curve |
| 3195 | 60,5 | Constant.AbstandInvers.Y | Distance, light barrier normalized, inverted |
| 3196 | 220,3 | Format.CutError.Y | Cutting error in [mm] |
| 3197 | 200,2 | PosControl.LIM_AREF.Y | Limited reference position (material position) |
| 3203 | 180,7 | Inc_Encoder.Dx_EnSync.Y | Position before the setting value (position value shortly before the pass marks) |
| 3204 | 180,7 | Inc_Encoder.I1220.Y | Position setting value, reference |
| 3205 | 180,4 | Inc_Encoder.SL3050.Y | Distance, light barrier + format |
| 3206 | 180,4 | Inc_Encoder.SL3110.Y | Distance, light barrier - format |
| 3209 | 180,7 | Inc_Encoder.DX_Pass.MOD | Distance, pass mark modulo format setpoint |
| 3214 | 90,7 | Input_T400.AE1_Filter.Y | AI1 smoothed |
| 3216 | 350,3 | RangeCheck.Cut_Range.Y | Limited position after range1 |
| 3218 | 80,5 | Constant.KONST3.Y4 | Gearbox factor, knife drive |
| 3219 | 90,7 | input_T400.AE2_Filter.Y | AI2 smoothed |
| 3221 | 350,5 | RangeCheck.KnifeRange.Y | Limited position after range3 |
| 3223 | 70,8 | Constant.NormFixLage1.Y | Fixed position 1 normalized |
| 3224 | 70,8 | Constant.NormFixLage2.Y | Fixed position 2 normalized |
| 3225 | 70,8 | Constant.NormFixLage3.Y | Fixed position 3 normalized |
| 3226 | 70,8 | Constant.NormFixLage4.Y | Fixed position 4 normalized |
| 3230 | 350,8 | RangeCheck.Ref_Range.Y | Limited position after range2 |
| 3233 | 70,8 | Constant.KONST4.Y3 | Fixed position 1 |
| 3234 | 70,8 | Constant.KONST4.Y4 | Fixed position 2 |
| 3235 | 70,8 | Constant.KONST4.Y5 | Fixed position 3 |
| 3236 | 70,8 | Constant.KONST4.Y6 | Fixed position 4 |
| 3241 | 490,3 | Ctrl_Error.F4410.Y | Blocking, \| setpoint velocity \| |
| 3242 | 490,3 | Ctrl_Error.F4430.Y | Blocking, absolute torque value |

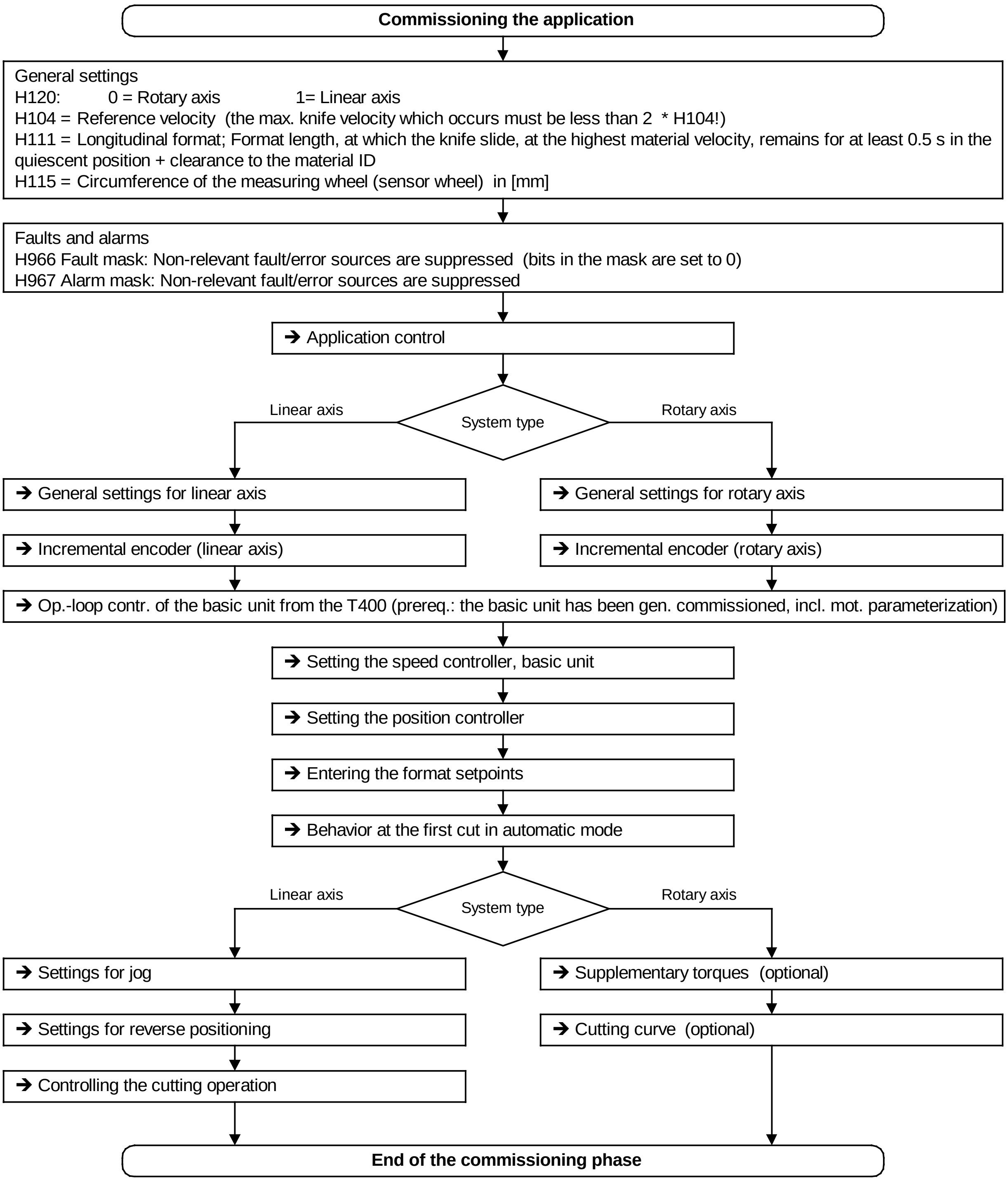
| TC | Chart | Path name | Significance |
|---|---|---|---|
| 3279 | 90,6 | input_T400.AE3_Filter.Y | AI3 smoothed |
| 3283 | 90,6 | input_T400.AE4_Filter.Y | AI4 smoothed |
| 3285 | 160,3 | inpAbsolut.SSI_CU_dw_r.Y | Absolute position from the basic drive before conditioning |
| 3287 | 90,6 | input_T400.AE5_Filter.Y | AI5 smoothed |
| 3290 | 150,4 | inpAbsolut.SSI_offset.Y | Absolute offset |
| 3291 | 150,4 | inpAbsolut.SSI_CU_ofs.Y | Absolute position, corrected |
| 3292 | 160,7 | inpAbsolut.SSI_CU_vofs.Y | Absolute position 2 (without offset) |
| 3311 | 170,4 | Inc_Encoder.I1120.Y | Shear position set value for synchronization (zero pulse) |
| 3313 | 170,7 | Inc_Encoder.I1140.Y | Setting value, knife position |
| 3317 | 170,4 | Inc_Encoder.SV_Coarse.Y | Setting value, knife position; referencing with coarse pulse |
| 3319 | 610,7 | input_CU.Istwert1_CU.Y | Actual value1 from CU as real |
| 3322 | 610,7 | input_CU.Istwert2_CU.Y | Actual value2 from CU as real |
| 3325 | 610,7 | input_CU.Istwert3_CU.Y | Actual value3 from CU as real |
| 3328 | 610,7 | input_CU.Istwert4_CU.Y | Actual value4 from CU as real |
| 3334 | 610,7 | input_CU.1.Y | Actual value DW1 from CU |
| 3335 | 170,8 | Inc_Encoder.StoreVal1.Y | 1st value stored in non-volatile memory |
| 3336 | 170,8 | Inc_Encoder.StoreVal2.Y | 2nd value stored in non-volatile memory |
| 3366 | 140,2 | Constant.KONST1.Y6 | Half pass mark synchronizing window width |
| 3367 | 135,8 | Inc_Encoder.RefPosModulo.Y | Reference position divided by the format setpoint |
| 3368 | 135,8 | Inc_Encoder.RefPosModulo.MOD | Reference position modulo divided by the format setpoint |
| 3370 | 145,5 | Inc_Encoder.RefposControl.COR | Correction value for the reference position |
| 3400 | 80,6 | Constant.n_Schere_Hz.Y | Reference frequency 1 |
| 3401 | 80,6 | Constant.n_Schere.Y | Reference speed 1 |
| 3402 | 80,6 | Constant.inv_NnennShear.Y | Reference speed 1 negated |
| 3410 | 120,7 | Inc_Encoder.I1100.Y | Absolute value, knife speed |
| 3411 | 120,7 | Inc_Encoder.I1360.Y | Knife speed, smoothed |
| 3412 | 120,7 | Inc_Encoder.MESSER.Y | Knife speed |
| 3413 | 120,7 | Inc_Encoder.KnifePos.Y | Knife position |
| 3414 | 120,7 | Inc_Encoder.MESSER.YP | Knife position, normalized |
| 3415 | 120,7 | Inc_Encoder.MESSER.YPS | Knife position at synchronization event (zero pulse) |
| 3420 | 80,5 | Constant.inv_NnennWeb.Y | Reference speed 2, negated |
| 3421 | 80,5 | Constant.n_Treiber.Y | Reference speed 2 |
| 3422 | 80,4 | Constant.PR2RP_B4.Y | Reference pulses 2 material sensing before rounding-off (float) |
| 3434 | 130,6 | Inc_Encoder.MATERIAL.Y | Speed2 |
| 3435 | 130,6 | Inc_Encoder.I1320.Y | Speed2 smoothed |
| 3436 | 130,5 | Inc_Encoder.I1320.YP | Position 2 before offset correction |
| 3437 | 135,5 | Inc_Encoder.MarkenSynchron.Y | Position2 |
| 3438 | 135,5 | Inc_Encoder.I1330.Y | Reference position |
| 3440 | 130,6 | Inc_Encoder.MATERIAL.YPS | Synchr. position |
| 3441 | 135,5 | Inc_Encoder.RefPosOffs.Y | Reference position minus offset |
| 3442 | 135,5 | Inc_Encoder.RefPosOffset.Y | Reference position offset |
| 3445 | 135,5 | Inc_Encoder.I2000.Y | Position, material in [mm] |
| 3447 | 130,6 | Inc_Encoder.P3050.Y | Format actual value |
| 3473 | 230,7 | PosControl.Positionierung.DIA | PosRG diagnostics |
| 3474 | 230,7 | PosControl.LageRegler.Y | PosRG Vset |
| 3480 | 230,7 | PosControl.PosRG_Vmax.Y | PosRG Vmax fixed value |
| 3484 | 230,5 | PosControl.Positionierung.YX | PosRG reference position |
| 3485 | 230,5 | PosControl.Positionierung.YV | PosRG setpoint velocity |
| 3486 | 230,6 | PosControl.PT1_Vpos.Y | PosRG_V_filt |
| 3489 | 230,2 | PosControl.LageRegler.YE | Position difference of the position controller |
| 3490 | 450,5 | PosControl.K3050.Y | Output of the KP characteristic |
| 3491 | 450,6 | Speed.CC1040.Y | Output, cutting curve |
| 3492 | 460,6 | Torque.FR1100.Y | Output, friction characteristic |
| 3493 | 460,6 | Torque.J1000.Y | Output, moment of inertia characteristic |
| 3494 | 460,6 | Torque.FrictionCurve.YP | Output derivation of the friction curve |
| 3495 | 460,7 | Torque.J1060.Y | Moment of inertia |

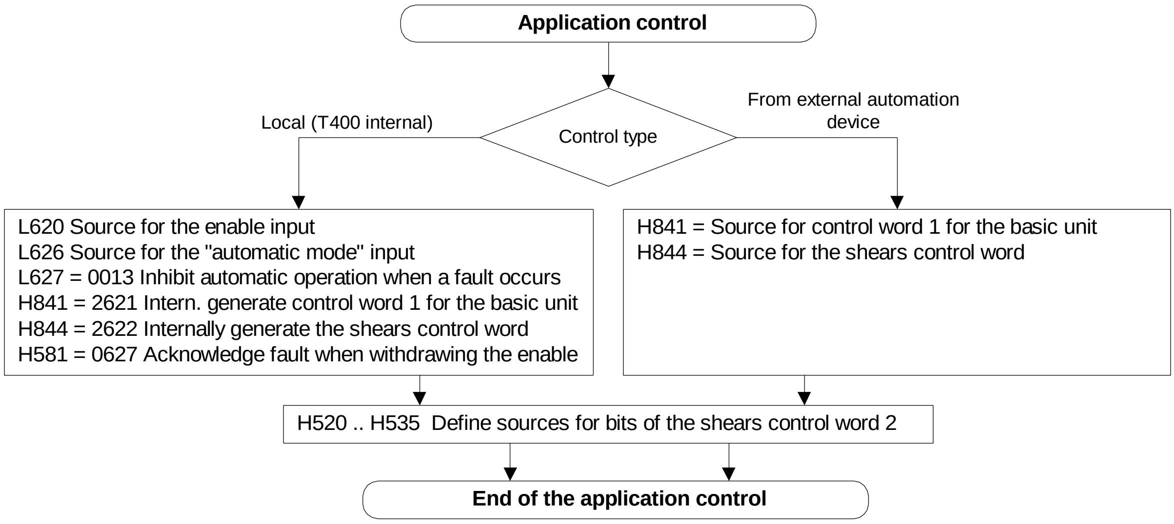
| TC | Chart | Path name | Significance |
|---|---|---|---|
| 3496 | 460,6 | Torque.InertiaCurve.YP | Output derivation of the inertia curve |
| 3497 | 450,6 | Speed.Cut_Curve.YP | Output derivation of the cutting curve |
| 3498 | 230,7 | PosControl.a_mal_J.Y | Torque setpoint output PosRG |
| 3517 | 260,8 | Speed.RampLokal.Y | Output ramp function for local speed |
| 3518 | 260,3 | Speed.neg_Tippen.Y | Negated speed setpoint for inching |
| 3519 | 260,1 | Constant.KONST3.Y5 | Speed setpoint for inching (fixed value) |
| 3533 | 260,6 | Speed.R3150.Y | Velocity in the local mode |
| 3558 | 240,3 | Torque.MJ1000.Y | Differential of the speed setpoint |
| 3559 | 240,3 | Torque.MA1300.Y | Differential of the moment of inertia |
| 3561 | 265,5 | Speed.CC1150.Y | Cutting speed for speed reduction |
| 3575 | 250,5 | Speed.R3013.Y | Max. speed for cutting modes |
| 3577 | 265,7 | Speed.CC1205.Y | Vset from the cutting curve |
| 3581 | 240,8 | Torque.TQ3000.Y | Actual torque limit, pos. |
| 3582 | 240,8 | Torque.TQ3100.Y | Actual torque limit, neg. |
| 3592 | 60,7 | Constant.NormDxPM.Y | Distance between pass marks (normalized) |
| 3593 | 60,7 | Constant.KONST1.Y7 | Distance between pass marks |
| 3604 | 440,5 | Free_FBs.I_R1.Y | I_R1_Y (output, integer->floating-point converter) |
| 3606 | 190,2 | Constant.KONST3.Y8 | Saw blade width |
| 3608 | 190,6 | Format.FMT_Limit2.Y | Actual minimum format |
| 3613 | 190,4 | Format.FM32b_norm.Y | Format DW |
| 3615 | 445,6 | Free_FBs.MUL3.Y | MUL_3 (output, multiplier 3) |
| 3616 | 190,3 | Format.FMT16_norm.Y | Format, word |
| 3617 | 250,4 | Speed.SQRT.Y | Square root function output |
| 3618 | 190,5 | Format.Q_FloatFormat.Y | Format, float |
| 3619 | 250,4 | Speed.SQRT_neg.Y | Output square root invers |
| 3620 | 190,8 | Format.Format_MUX.Y | Format request |
| 3621 | 190,4 | Constant.FixFormate.Y1 | Fixformat 1 |
| 3622 | 190,5 | Constant.FixFormate.Y2 | Fixformat 2 |
| 3623 | 190,5 | Constant.FixFormate.Y3 | Fixformat 3 |
| 3624 | 190,5 | Constant.FixFormate.Y4 | Fixformat 4 |
| 3625 | 190,6 | Constant.FixFormate.Y5 | Fixformat 5 |
| 3629 | 190,8 | Format.Format_norm.Y | Format setpoint |
| 3630 | 220,7 | Format.P1055.Y | Setpoint, format controller |
| 3631 | 220,7 | Format.AktFormat.Y | Actual Format setpoint [mm] |
| 3649 | 60,7 | Constant.NormRes1.Y | Reserve1 normalized |
| 3650 | 70,3 | Constant.Festwert1.Y1 | Fixed value1 |
| 3651 | 70,3 | Constant.Festwert1.Y2 | Fixed value2 |
| 3652 | 70,3 | Constant.Festwert1.Y3 | Fixed value3 |
| 3653 | 70,3 | Constant.Festwert1.Y4 | Fixed value4 |
| 3654 | 70,3 | Constant.Festwert1.Y5 | Fixed value5 |
| 3655 | 70,3 | Constant.Festwert1.Y6 | Fixed value6 |
| 3656 | 70,3 | Constant.Festwert1.Y7 | Fixed value7 |
| 3657 | 70,3 | Constant.Festwert1.Y8 | Fixed value8 |
| 3658 | 70,3 | Constant.Festwert2.Y1 | Fixed value9 |
| 3659 | 70,3 | Constant.Festwert2.Y2 | Fixed value10 |
| 3660 | 70,3 | Constant.Festwert2.Y3 | Fixed value11 |
| 3661 | 70,3 | Constant.Festwert2.Y4 | Fixed value12 |
| 3662 | 70,3 | Constant.Festwert2.Y5 | Fixed value13 |
| 3663 | 70,3 | Constant.Festwert2.Y6 | Fixed value14 |
| 3664 | 70,3 | Constant.Festwert2.Y7 | Fixed value15 |
| 3665 | 70,3 | Constant.Festwert2.Y8 | Fixed value16 |
| 3685 | 430,2 | Constant.KONST4.Y7 | Free floating-point connector |
| 3686 | 430,2 | Constant.KONST4.Y8 | Free floating-point connector |
| 3705 | 480,2 | Ctrl_Error.MinLageNorm.Y | Min. Shear Pos. Norm. |
| 3706 | 430,2 | Free_FBs.Switch1.Y | Output 1st selection switch (free block) |
| 3707 | 480,2 | Ctrl_Error.MaxLageNorm.Y | Max. shear pos. Norm. |

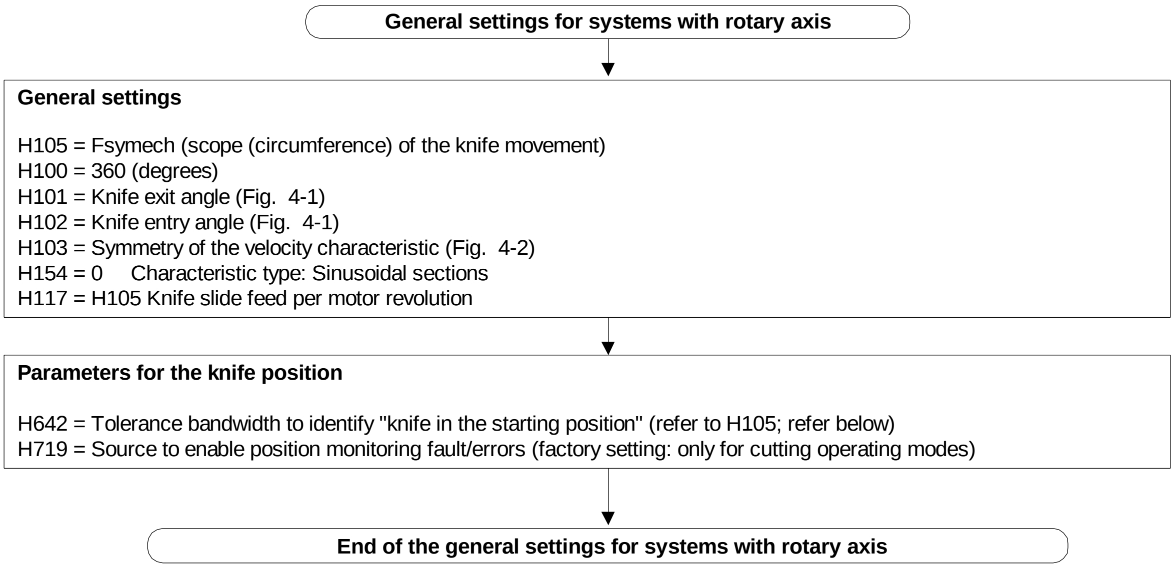
| TC | Chart | Path name | Significance |
|---|---|---|---|
| 3708 | 480,4 | Ctrl_Error.LageErrMax.Y | Position error lower limit |
| 3709 | 480,4 | Ctrl_Error.LageErrMin.Y | Position error upper limit |
| 3715 | 480,2 | Ctrl_Error.Grenzwerte.Y1 | Knife position lower limit |
| 3716 | 430,4 | Free_FBs.Switch2.Y | Output 2nd selection switch (free block) |
| 3717 | 480,2 | Ctrl_Error.Grenzwerte.Y2 | Knife position upper limit |
| 3720 | 435,8 | Free_FBs.RampGen.Y | Ramp-function generator output |
| 3740 | 436,7 | Free_FBs.FreePT1.Y | Output, lowpass filter (free block) |
| 3742 | 436,7 | Free_FBs.SperrFilt.Y | Output, bandstop filter (free block) |
| 3747 | 435,3 | Free_FBs.Begrenzer.Y | Output, limiter block (free block) |
| 3753 | 435,3 | Free_FBs.Kennlin.Y | Output, 2-point characteristic (free block) |
| 3763 | 440,7 | Free_FBs.Free_N4_R.Y | Output, double word to float converter (free block) |
| 3765 | 440,5 | Free_FBs.Free_N2_R.Y | Output, word to float converter (free block) |
| 3779 | 640,3 | output.Vsoll_NSW.Y | Setpoint 1 CU |
| 3785 | 640,3 | output.Msoll_NSW.Y | Setpoint 2 CU |
| 3786 | 445,4 | Free_FBs.ADD1.Y | ADD_1 (output, adder 1) |
| 3789 | 445,4 | Free_FBs.ADD2.Y | ADD_2 (output, adder 2) |
| 3792 | 445,4 | Free_FBs.SUB1.Y | SUB_1 (output, subtractor 1) |
| 3794 | 445,4 | Free_FBs.SUB2.Y | SUB_2 (output, subtractor 2) |
| 3796 | 445,6 | Free_FBs.MUL1.Y | MUL_1 (output, multiplier 1) |
| 3799 | 445,6 | Free_FBs.MUL2.Y | MUL_2 (output, multiplier 2) |
| 3802 | 445,6 | Free_FBs.DIV1.Y | DIV_1 (output, divider 1) |
| 3804 | 445,6 | Free_FBs.DIV2.Y | DIV_2 (output, divider 2) |
| 3808 | 445,4 | Free_FBs.ADD3.Y | ADD_3 (output 3rd adder) |
| 3814 | 670,7 | input_CB.CB_DW1.Y | Setpoint DW1 CB |
| 3818 | 670,7 | input_CB.Sollwert1_CB.Y | Setpoint 1 CB |
| 3819 | 435,7 | Free_FBs.Integrator.Y | Output, free integrator |
| 3821 | 670,7 | input_CB.Sollwert2_CB.Y | Setpoint 2 CB |
| 3824 | 670,7 | input_CB.Sollwert3_CB.Y | Setpoint 3 CB |
| 3825 | 430,6 | Free_FBs.Switch3.Y | Switch3 (output, changeover switch) |
| 3827 | 430,8 | Free_FBs.Switch4.Y | Switch4 (output, changeover switch) |
| 3932 | 670,7 | input_CB.Sollwert4_CB.Y | Setpoint 4 CB |
| 5000 | 70,2 | Constant.Konst_DI.Y1 | 0 (double word) |
| 5001 | 70,2 | Constant.Konst_DI.Y2 | 1 (double word |
| 5061 | 790,3 | Peer.RecPZD1.YDI | Peer receive: PZD2 and PZD3 as double word |
| 5063 | 790,3 | Peer.RecPZD2.YDI | Peer receive: PZD4 and PZD5 as double word |
| 5179 | 150,7 | inpAbsolut.Absolutgebe.YOP | AENC encoder position (original value) |
| 5402 | 80,6 | Constant.RP_Schere.Y | Reference pulses 1 |
| 5403 | 80,6 | Constant.RPneg_Schere.Y | Reference pulses 1 negated |
| 5422 | 80,4 | Constant.RP_Treiber.Y | Reference pulses 2 |
| 5423 | 80,4 | Constant.negRPweb.Y | Reference pulses 2 negated |
| 5640 | 430,8 | Free_FBs.Switch_DI.Y | Output 32bit integer changeover switch |
| 5679 | 70,8 | Constant.Konst_DI.Y3 | Fixed value DI1 |
| 5680 | 70,8 | Constant.Konst_DI.Y4 | Fixed value DI2 |
| 5681 | 70,8 | Constant.Konst_DI.Y5 | Fixed value DI3 |
| 5682 | 70,8 | Constant.Konst_DI.Y6 | Fixed value DI4 |
| 5683 | 70,8 | Constant.Konst_DI.Y7 | Fixed value DI5 |
| 5684 | 70,8 | Constant.Konst_DI.Y8 | Fixed value DI6 |
| 5811 | 440,7 | Free_FBs.R_DI_1.Y | R_DI (real ➔ double word-converter) |
| 5814 | 445,2 | Free_FBs.MULI_1.YDI | MULI_1 (double word output, integer-multiplier) |
| 5816 | 440,6 | Free_FBs.WDW1.Y | W_DW1 (output, word->double word-converter) |

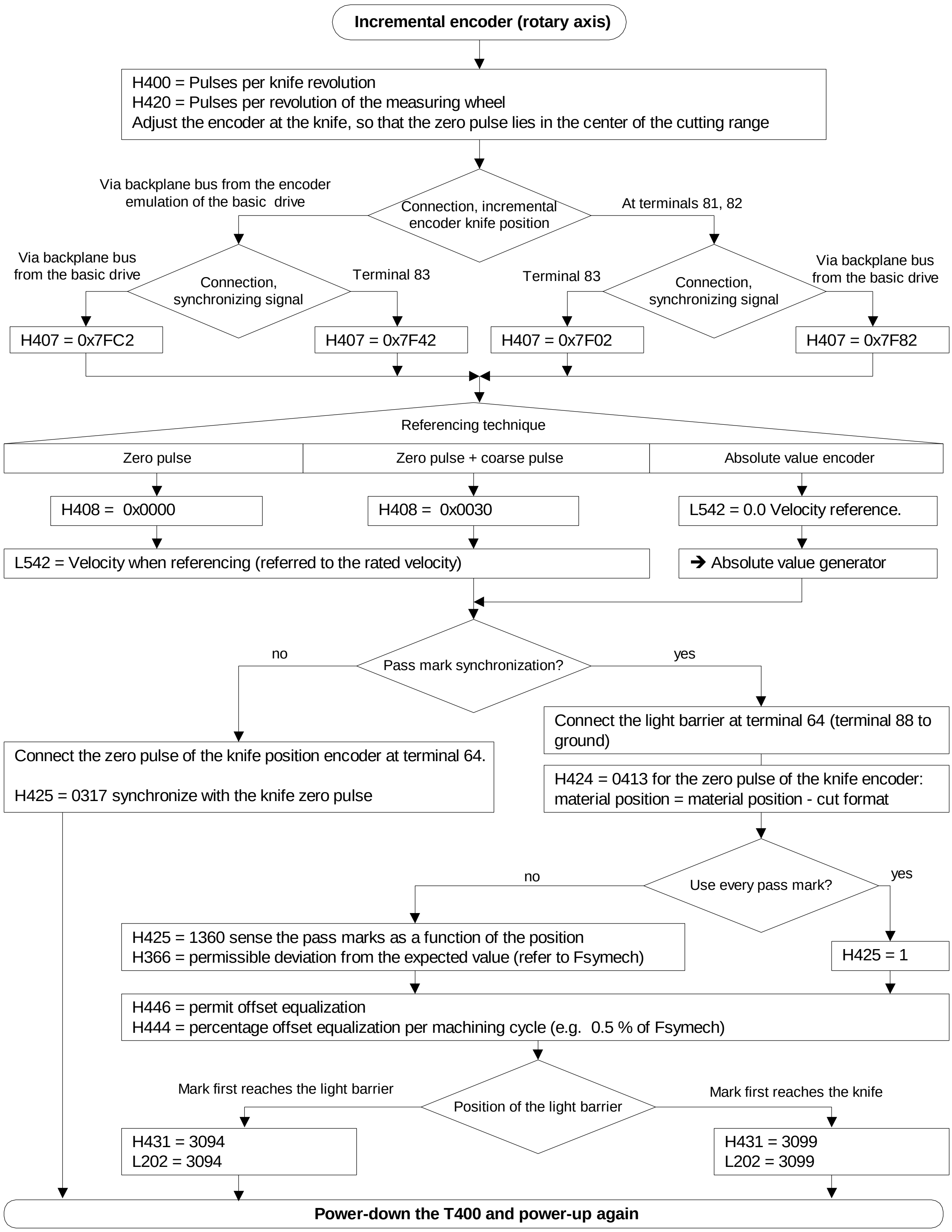
# 7 Typical commissioning

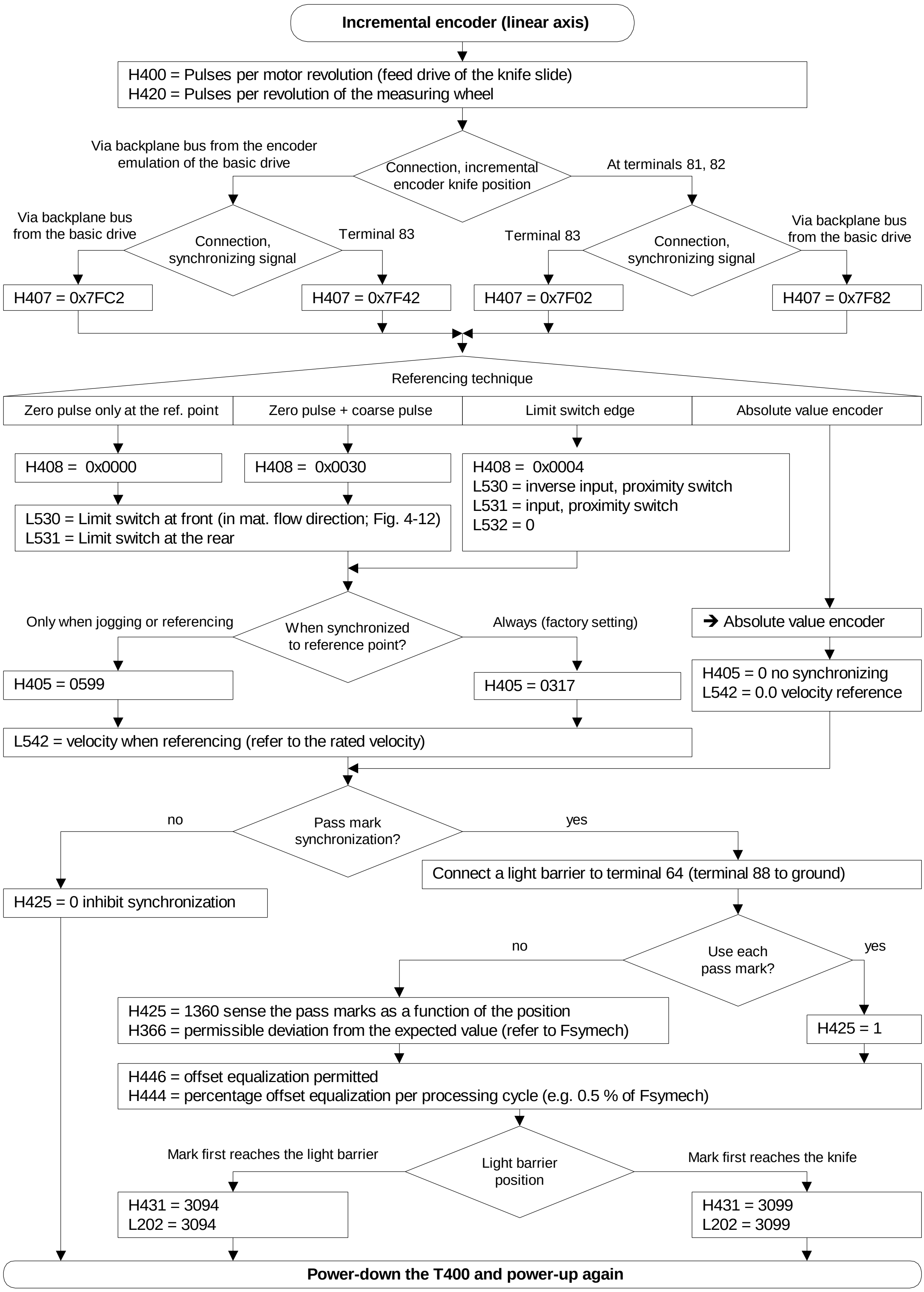
## 7.1 General procedure




Application control
Local (T400 internal)
Control type
From external automation device
L620 Source for the enable input
L626 Source for the "automatic mode" input
L627 = 0013 Inhibit automatic operation when a fault occurs
H841 = 2621 Intern. generate control word 1 for the basic unit
H844 = 2622 Internally generate the shears control word
H581 = 0627 Acknowledge fault when withdrawing the enable
H841 = Source for control word 1 for the basic unit
H844 = Source for the shears control word
H520 .. H535 Define sources for bits of the shears control word 2
End of the application control


General settings for systems with rotary axis
General settings
H105 = Fsymech (scope (circumference) of the knife movement)
H100 = 360 (degrees)
H101 = Knife exit angle (Fig. 4-1)
H102 = Knife entry angle (Fig. 4-1)
H103 = Symmetry of the velocity characteristic (Fig. 4-2)
H154 = 0 Characteristic type: Sinusoidal sections
H117 = H105 Knife slide feed per motor revolution
Parameters for the knife position
H642 = Tolerance bandwidth to identify "knife in the starting position" (refer to H105; refer below)
H719 = Source to enable position monitoring fault/errors (factory setting: only for cutting operating modes)
End of the general settings for systems with rotary axis


Incremental encoder (rotary axis)
H400 = Pulses per knife revolution
H420 = Pulses per revolution of the measuring wheel
Adjust the encoder at the knife, so that the zero pulse lies in the center of the cutting range
Via backplane bus from the encoder emulation of the basic drive
Connection, incremental encoder knife position
At terminals 81, 82
Via backplane bus from the basic drive
Connection, synchronizing signal
Terminal 83
Terminal 83
Connection, synchronizing signal
Via backplane bus from the basic drive
H407 = 0x7FC2
H407 = 0x7F42
H407 = 0x7F02
H407 = 0x7F82
Referencing technique
Zero pulse
Zero pulse + coarse pulse
Absolute value encoder
H408 = 0x0000
H408 = 0x0030
L542 = 0.0 Velocity reference.
L542 = Velocity when referencing (referred to the rated velocity)
➔ Absolute value generator
no
Pass mark synchronization?
yes
Connect the light barrier at terminal 64 (terminal 88 to ground)
Connect the zero pulse of the knife position encoder at terminal 64.
H425 = 0317 synchronize with the knife zero pulse
H424 = 0413 for the zero pulse of the knife encoder: material position = material position - cut format
no
Use every pass mark?
yes
H425 = 1360 sense the pass marks as a function of the position
H366 = permissible deviation from the expected value (refer to Fsymech)
H425 = 1
H446 = permit offset equalization
H444 = percentage offset equalization per machining cycle (e.g. 0.5 % of Fsymech)
Mark first reaches the light barrier
Position of the light barrier
Mark first reaches the knife
H431 = 3094
L202 = 3094
H431 = 3099
L202 = 3099
Power-down the T400 and power-up again


Incremental encoder (linear axis)
H400 = Pulses per motor revolution (feed drive of the knife slide)
H420 = Pulses per revolution of the measuring wheel
Via backplane bus from the encoder emulation of the basic drive
Connection, incremental encoder knife position
At terminals 81, 82
Via backplane bus from the basic drive
Connection, synchronizing signal
Terminal 83
Terminal 83
Connection, synchronizing signal
Via backplane bus from the basic drive
H407 = 0x7FC2
H407 = 0x7F42
H407 = 0x7F02
H407 = 0x7F82
Referencing technique
Zero pulse only at the ref. point
Zero pulse + coarse pulse
Limit switch edge
Absolute value encoder
H408 = 0x0000
H408 = 0x0030
H408 = 0x0004
L530 = inverse input, proximity switch
L531 = input, proximity switch
L532 = 0
L530 = Limit switch at front (in mat. flow direction; Fig. 4-12)
L531 = Limit switch at the rear
Only when jogging or referencing
When synchronized to reference point?
Always (factory setting)
➔ Absolute value encoder
H405 = 0599
H405 = 0317
H405 = 0 no synchronizing
L542 = 0.0 velocity reference
L542 = velocity when referencing (refer to the rated velocity)
no
Pass mark synchronization?
yes
Connect a light barrier to terminal 64 (terminal 88 to ground)
H425 = 0 inhibit synchronization
no
Use each pass mark?
yes
H425 = 1360 sense the pass marks as a function of the position
H366 = permissible deviation from the expected value (refer to Fsymech)
H425 = 1
H446 = offset equalization permitted
H444 = percentage offset equalization per processing cycle (e.g. 0.5 % of Fsymech)
Mark first reaches the light barrier
Light barrier position
Mark first reaches the knife
H431 = 3094
L202 = 3094
H431 = 3099
L202 = 3099
Power-down the T400 and power-up again

**General settings for systems with linear axis**

↓

**General settings**

H101 = 0
H103 = 0
H154 = 2 Characteristic type: linear ramp with rounding-off
H117 = Feed of the knife slide per motor revolution

↓

**Parameters for the knife position**

H197 = 3441 Shift the material coordinate system to the knife quiescent position
L201 = 3168 Shift the coordinate system for "Starting length"
H451 = 3662 Format range for the linear axis
H642 = Tolerance bandwidth for identifying "knife in the starting position" (refer to H105; refer below)
H715 = Lowest position value of the knife slide in the range in [mm] (recommended: 0)
H717 = Highest position value of the knife slide in operation in [mm]
H718 = Knife position monitoring tolerance in [mm]
H719 = Source to enable position monitoring errors (factory setting: Only for cutting operating modes)
L574 = 3617 Decrease velocity to zero at the end of traversing

↓

**Distance normalization**

H105 Fsymech = accelerating travel at max. material velocity
H100 = H105
H102 = H105

Formula $Xacc = \frac{Vmax^2}{2 \cdot Amax}$ with: Vmax max. material velocity; Amax max. acceleration of the knife slide

Characteristic type

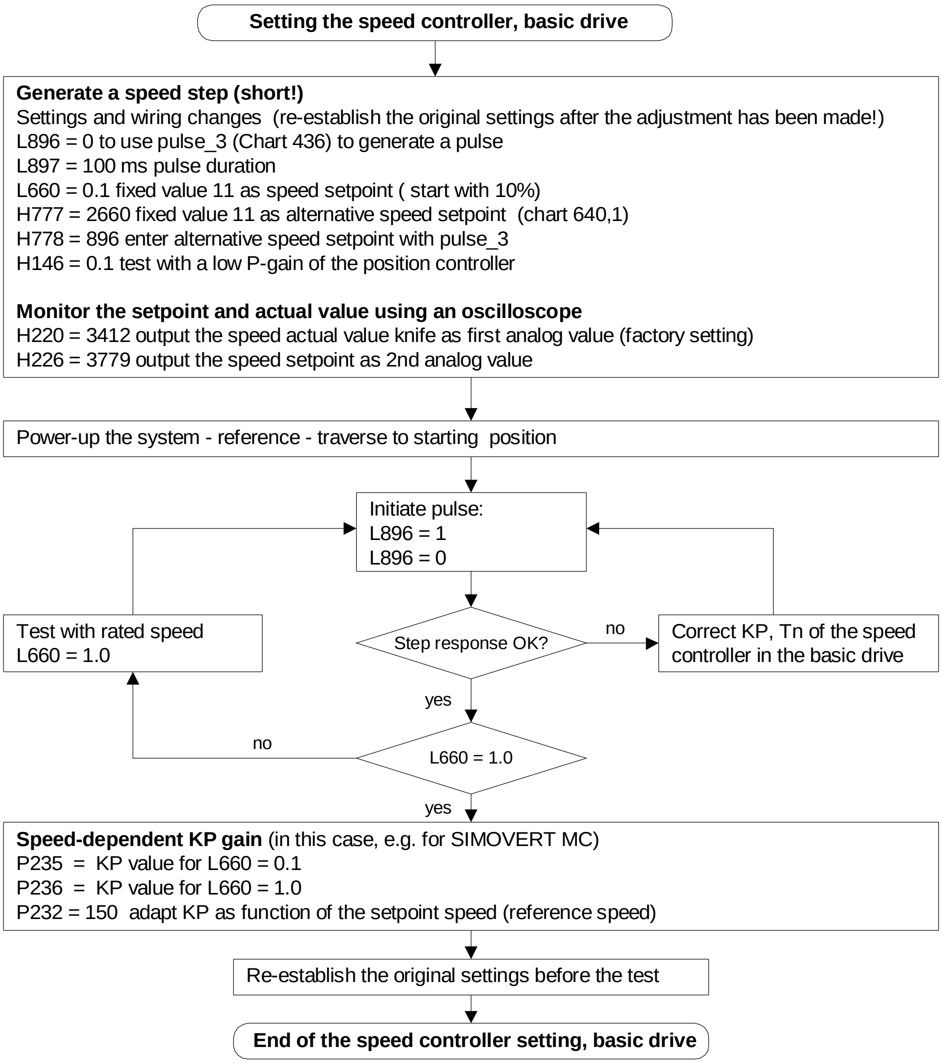
| H154 | Acceleration travel |
|---|---|
| 0 | H105 > Xacc |
| 1 | H105 > 2 * Xacc |
| 2 | H105 > 1.1 * Xacc |

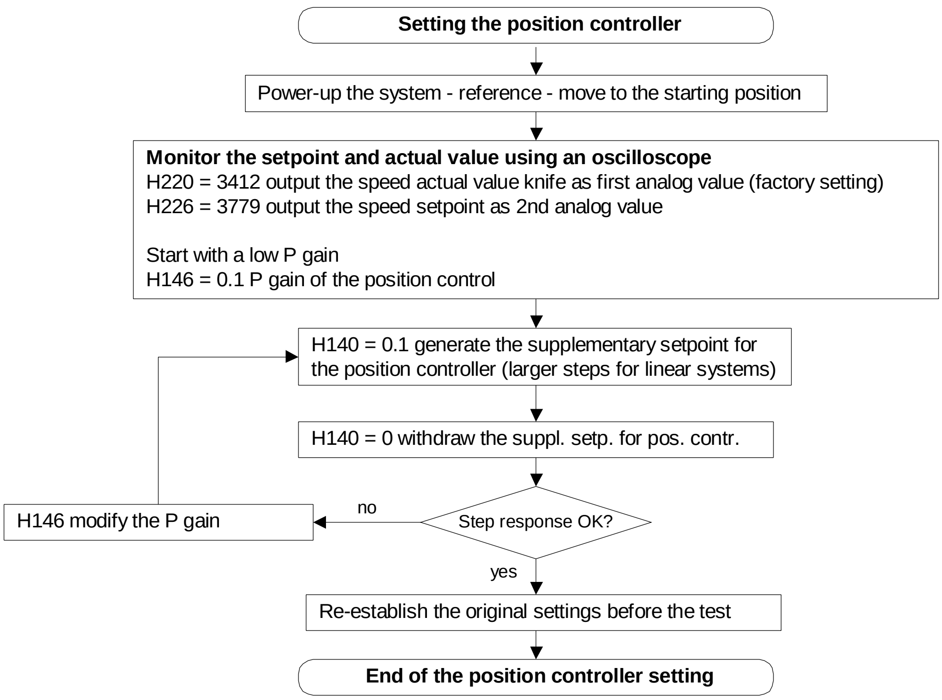
**Caution**: In order to avoid rounding-off errors for the position/distance sensing, H105 must be set a multiple of the measuring wheel resolution.

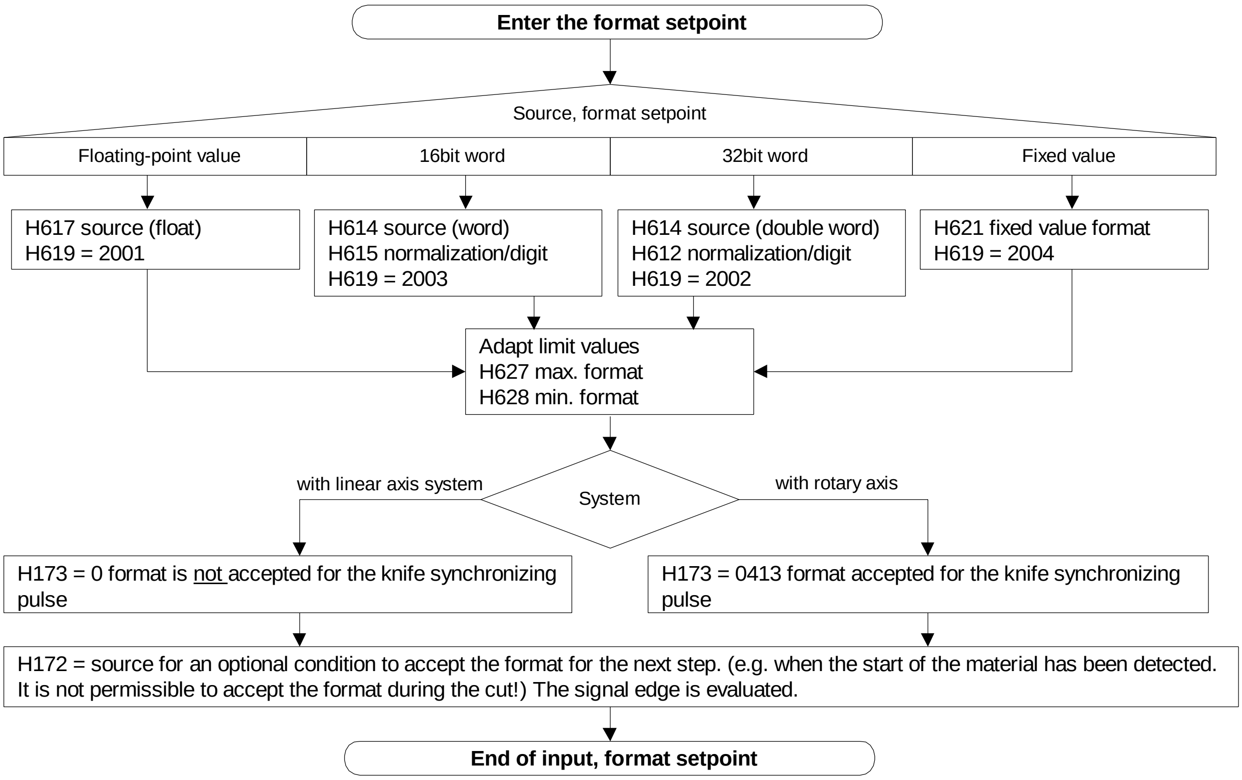
| | | |
|---|---|---|
| Example: | From Xacc H105 > 45 mm is obtained | |
| Measuring wheel circumference: | 400 mm | |
| Pulses/revolution, measuring wheel: | 4 * 2048 = 8192 | |
| Resolution, measuring wheel: | 0.04883 mm | => 45 mm corresponds to 921.6 pulses |
| Select Fsymech: | H105 = 922 * 0.04883 = 45.019 mm | |

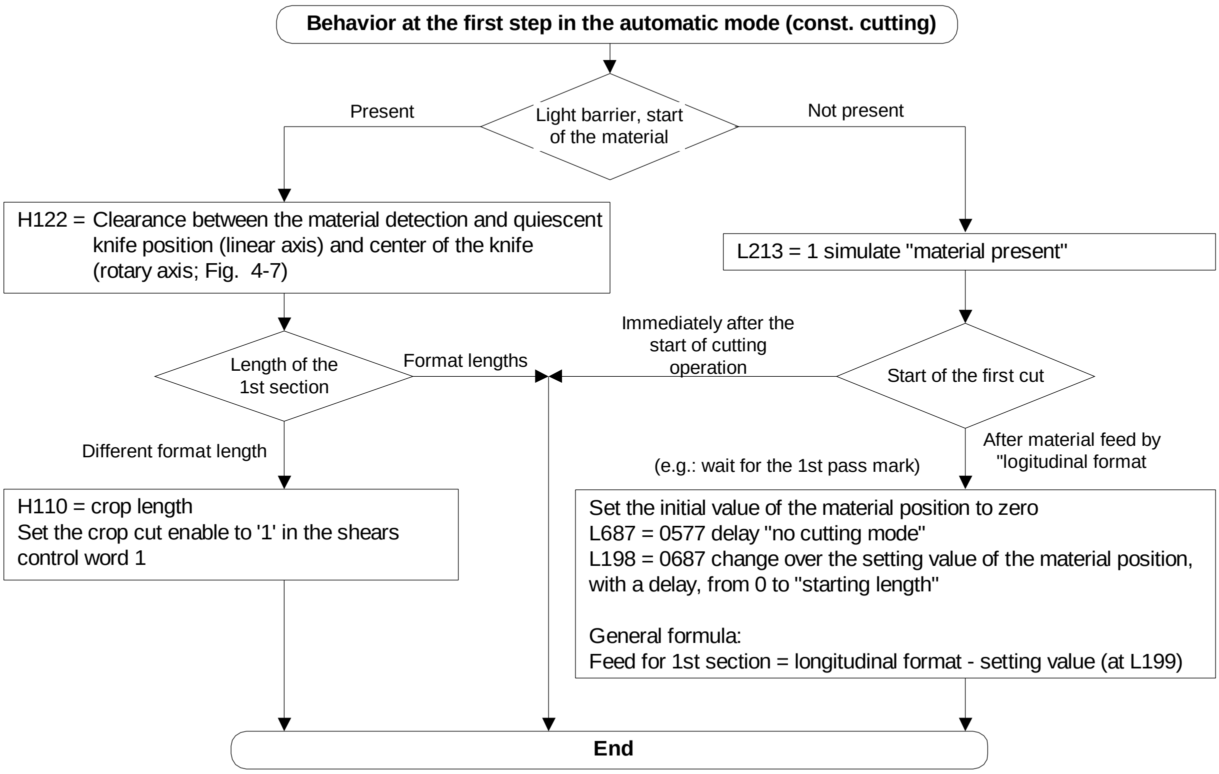
↓

**End of the general settings for linear systems**


Setting the speed controller, basic drive
Generate a speed step (short!)
Settings and wiring changes (re-establish the original settings after the adjustment has been made!)
L896 = 0 to use pulse_3 (Chart 436) to generate a pulse
L897 = 100 ms pulse duration
L660 = 0.1 fixed value 11 as speed setpoint ( start with 10%)
H777 = 2660 fixed value 11 as alternative speed setpoint (chart 640,1)
H778 = 896 enter alternative speed setpoint with pulse_3
H146 = 0.1 test with a low P-gain of the position controller
Monitor the setpoint and actual value using an oscilloscope
H220 = 3412 output the speed actual value knife as first analog value (factory setting)
H226 = 3779 output the speed setpoint as 2nd analog value
Power-up the system - reference - traverse to starting position
Initiate pulse:
L896 = 1
L896 = 0
Test with rated speed
L660 = 1.0
Step response OK?
no
Correct KP, Tn of the speed controller in the basic drive
yes
no
L660 = 1.0
yes
Speed-dependent KP gain (in this case, e.g. for SIMOVERT MC)
P235 = KP value for L660 = 0.1
P236 = KP value for L660 = 1.0
P232 = 150 adapt KP as function of the setpoint speed (reference speed)
Re-establish the original settings before the test
End of the speed controller setting, basic drive


Setting the position controller
Power-up the system - reference - move to the starting position
Monitor the setpoint and actual value using an oscilloscope
H220 = 3412 output the speed actual value knife as first analog value (factory setting)
H226 = 3779 output the speed setpoint as 2nd analog value
Start with a low P gain
H146 = 0.1 P gain of the position control
H140 = 0.1 generate the supplementary setpoint for the position controller (larger steps for linear systems)
H140 = 0 withdraw the suppl. setp. for pos. contr.
H146 modify the P gain
no
Step response OK?
yes
Re-establish the original settings before the test
End of the position controller setting


Enter the format setpoint
Source, format setpoint
Floating-point value
16bit word
32bit word
Fixed value
H617 source (float)
H619 = 2001
H614 source (word)
H615 normalization/digit
H619 = 2003
H614 source (double word)
H612 normalization/digit
H619 = 2002
H621 fixed value format
H619 = 2004
Adapt limit values
H627 max. format
H628 min. format
with linear axis system
System
with rotary axis
H173 = 0 format is not accepted for the knife synchronizing pulse
H173 = 0413 format accepted for the knife synchronizing pulse
H172 = source for an optional condition to accept the format for the next step. (e.g. when the start of the material has been detected. It is not permissible to accept the format during the cut!) The signal edge is evaluated.
End of input, format setpoint


Behavior at the first step in the automatic mode (const. cutting)
Present
Light barrier, start of the material
Not present
H122 = Clearance between the material detection and quiescent knife position (linear axis) and center of the knife (rotary axis; Fig. 4-7)
L213 = 1 simulate "material present"
Length of the 1st section
Format lengths
Immediately after the start of cutting operation
Start of the first cut
Different format length
(e.g.: wait for the 1st pass mark)
After material feed by "logitudinal format
H110 = crop length
Set the crop cut enable to '1' in the shears control word 1
Set the initial value of the material position to zero
L687 = 0577 delay "no cutting mode"
L198 = 0687 change over the setting value of the material position, with a delay, from 0 to "starting length"
General formula:
Feed for 1st section = longitudinal format - setting value (at L199)
End

**Settings for jogging**

↓

H523 source for jogging 1
H524 source for jogging 2
H497 source to enable jogging (factory setting: if cutting mode is not active)
L521 source for front limit switch, inverse (inhibits jogging 1 if the limit switch is active)
L522 source for rear limit switch, inverse (inhibits jogging 2 if the limit switch is active)
L519 velocity for jogging (referred to H104 V_rated)
L540 number of ramp-up stages for the velocity when jogging and referencing

↓

**Checking distance normalization**:
- Move the knife, after referencing, into the start position
- Move the knife to the end of the traversing distance (in the direction of the material flow)
- The knife position (d413) must be the same as the distance between the knife and the starting pos.! (if this is not identical, correct H117 feed/revolution and H400 pulses/revolution)

↓

**End of the settings for jogging**

**Settings for re-positioning**

↓

H481 acceleration $H481 < \frac{\text{max. slide acceleration}}{\text{slide feed/motor revolution}}$

H478 rounding-off $H478 = \frac{H481}{\text{time to establish torque}}$

H479 final rounding-off (calculation, analog to H478)

Examples

$H481 < \frac{5\ m/s^2}{10\ mm} = 500\ ^1/s^2$

$H478 = \frac{500\ 1/s^2}{20\ ms} = 25000\ ^1/s^3$

↓

**Logic which is recommended to activate positioning**
Sources (the factory settings are in brackets)
L331 de-activation signal (0665 no_enable)
L332 optional abort condition (0644 in_start position)
L333 start condition 1 (0576 cutting mode)
L334 start condition 2 (e.g. cut completed; knife raised, or similar.)
L335 optional
L336 end of condition 1 (0499 positioning/setpoint generator active)
L337 end of condition 2 (1347 positioning_mode)
L338 optional start condition (0236 material_cut)

Conditions to start positioning
L339 = 0x008C material_cut AND cut_completed AND cutting mode

Conditions for exiting the positioning mode
L343 = 0x2040 positioning_no_longer_active AND positioning_mode
L346 = 0x0003 no_enable OR optional abort condition

↓

Behavior, if the knife slide does not return to the starting position in time for the next cut (cause: format too short, velocity too high or cut type too long )

L196 = 1348 delays the start of the new cut until positioning has been completed. The reference format size can no longer be maintained!

↓

**End of the settings for return positioning**

**Cutting operation control**

Start cutting with STATE_logic2 (Chart 415)
Define the prerequisites for the start of cutting. The inputs and the logical equations to initiate a cut are specified. Operation must always be enabled.

General conditions (automatic cut)
1. Cutting mode must be active
2. The knife must be in synchronism with the material
3. A cut has still not been made (so that cuts aren't made a multiple number of times one after the other)

Optional conditions (automatic cut)
4. The knife is located within the permitted lowering range (this takes into account that there is sufficient time to raise the knife).

Manual cut in the automatic mode
A manual cut is initiated, with the material running, by setting the material position to the "starting length" value (refer below). The start of the cut is obtained from the conditions 1 to 5 above. If the material is stationary, this could be confusing for operating personnel, as the cut would only be made when the material web starts to move again. Thus, if the material web is stationary, immediately make a manual cut.

Conditions
5. Material velocity = 0
6. Cutting mode
7. Manual cut request
8. Knife in the quiescent position

Conditions for a manual cut (the cutting mode has been disabled)
9. Request manual cut (this should be in the form of a pulse, which is available for at least as long as the cut lasts)
10. Cutting mode not active
11. The material must be stationary

End of cut

Time-controlled:

Define the sequence (time) for the cutting signal using free blocks (refer to the example in Section 7.1).

Reset the cutting logic (STATE_Logic2) with the start of the cutting pulse.

Contact-controlled (knife at the top; knife at the bottom):

Reset the cutting logic with the "knife at the bottom" signal.

Use STATE_logic1 (Chart 415) for "raise knife".
Start conditions for "raise knife"

General conditions
1. Enable signal present
2. Knife not at the top

Automatic mode
3. Knife at the bottom
4. Cutting mode
5. Optional: Outside the permissible lowering range (alternative to "knife below")

Manual operation
6. Request "raise knife"
7. No cutting mode active

"Material cut" is set with a reset pulse from the cutting logic (connector 1277) (this prevents multiple cuts)

Manual cut in the automatic mode

is used:

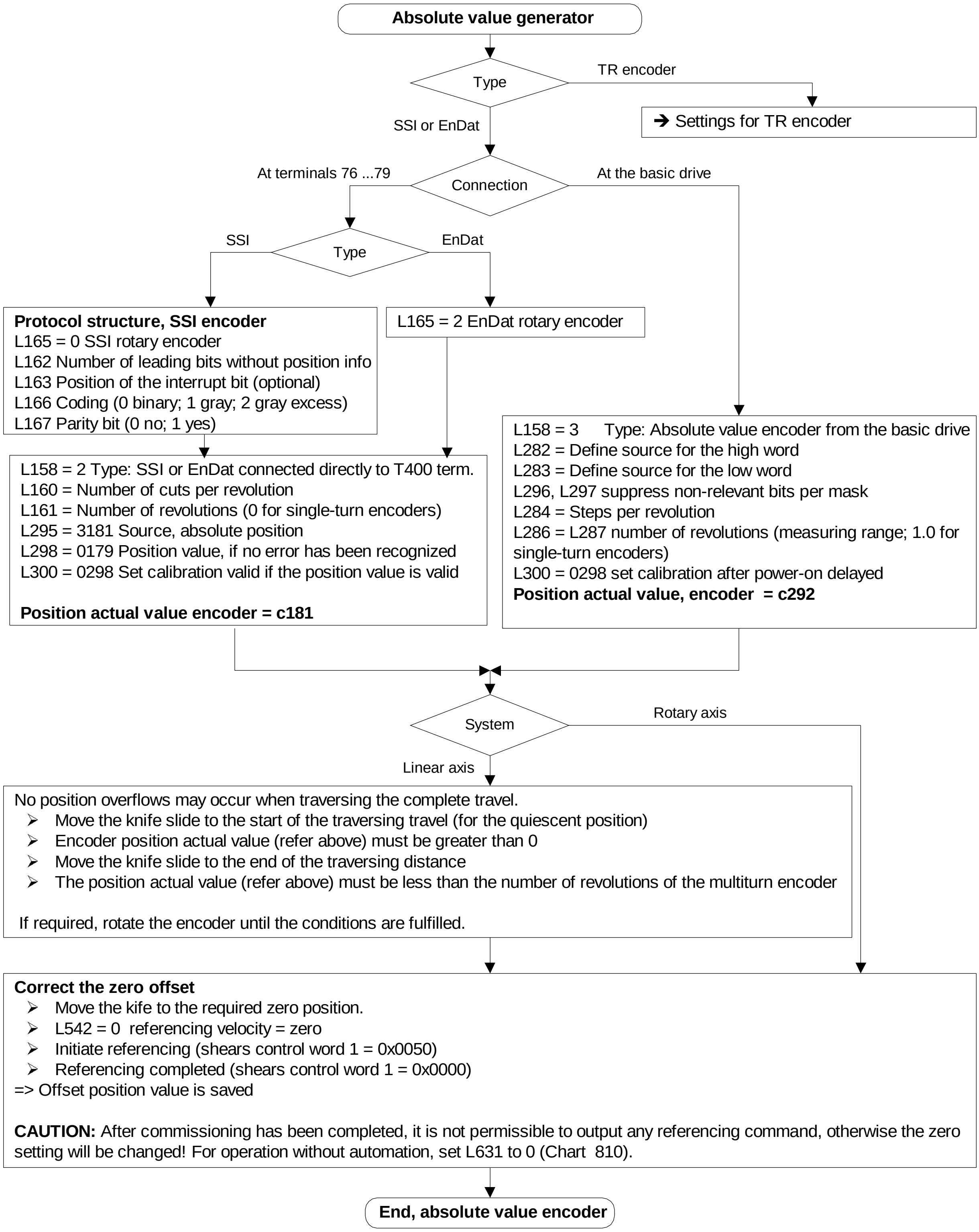
Implementation: STATE logic3 (Chart 421)
L195 = 0935 use a positive output pulse in order to set the material position to "starting length".

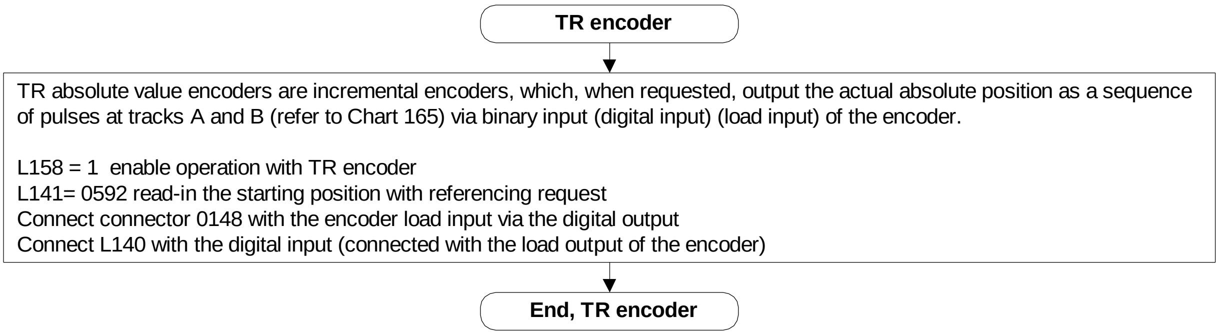
Start conditions
1. Cutting operation
2. Knife in the start position
3. Manual cut request

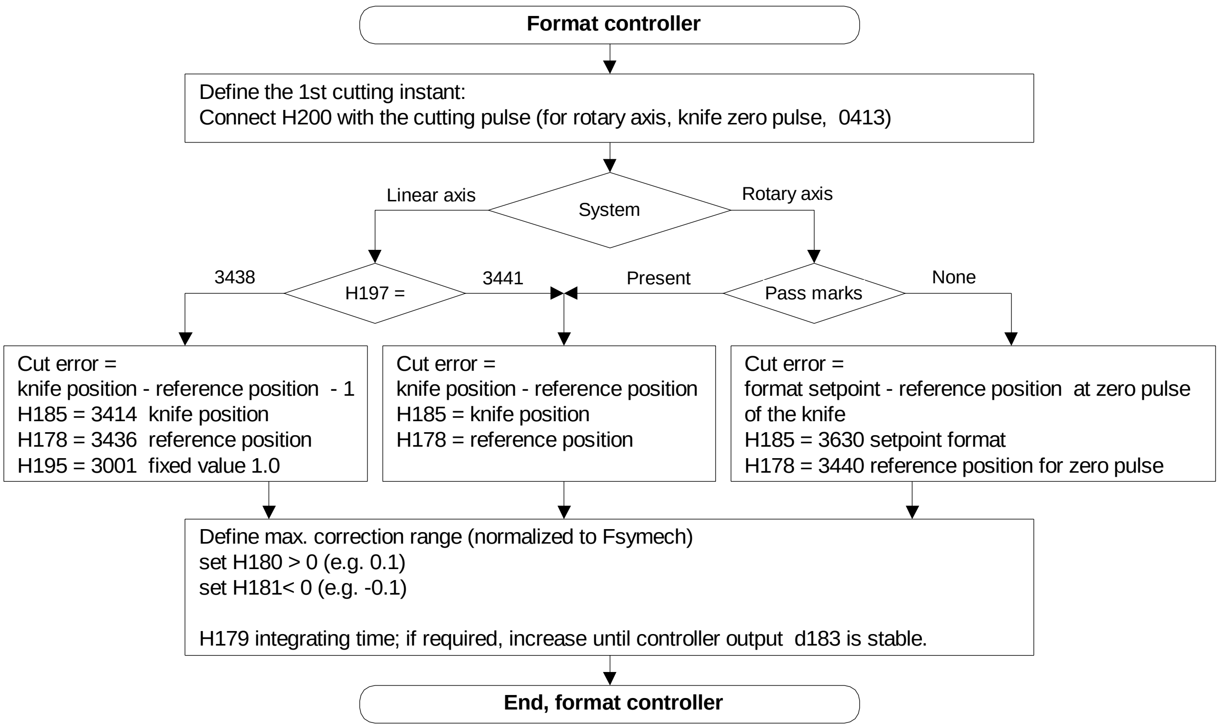
Exit condition
4. No manual cut request

not required: (go to End of the cut control)

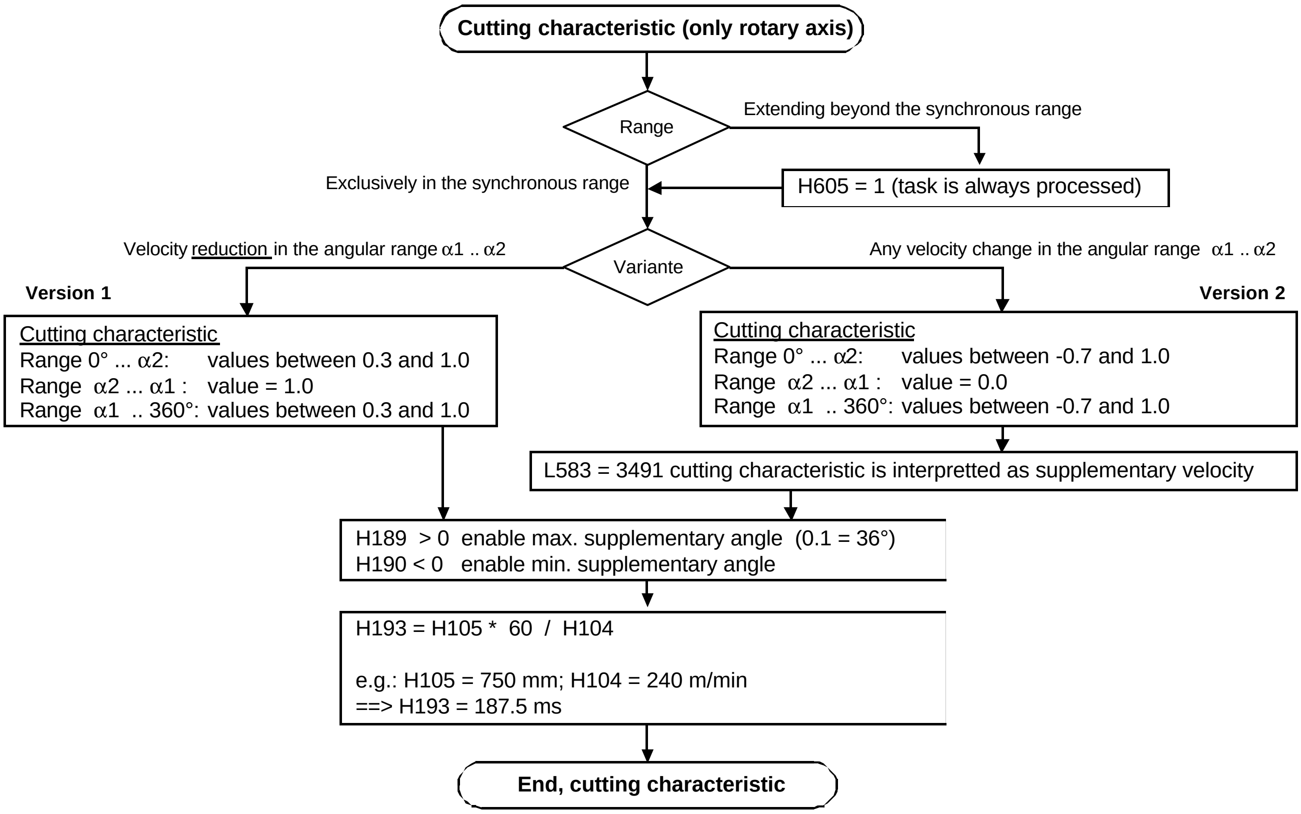
**End of the cut control**

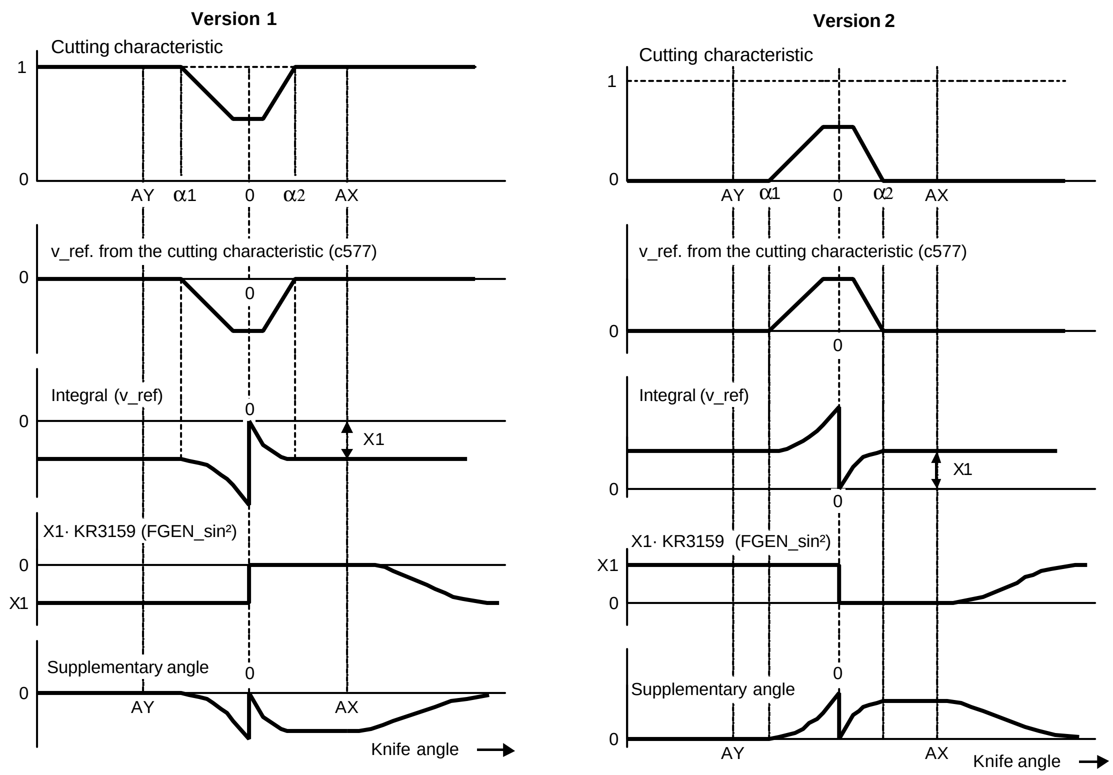

Absolute value generator
Type
TR encoder
➔ Settings for TR encoder
SSI or EnDat
At terminals 76 ...79
Connection
At the basic drive
SSI
Type
EnDat
Protocol structure, SSI encoder
L165 = 0 SSI rotary encoder
L162 Number of leading bits without position info
L163 Position of the interrupt bit (optional)
L166 Coding (0 binary; 1 gray; 2 gray excess)
L167 Parity bit (0 no; 1 yes)
L165 = 2 EnDat rotary encoder
L158 = 3 Type: Absolute value encoder from the basic drive
L282 = Define source for the high word
L283 = Define source for the low word
L296, L297 suppress non-relevant bits per mask
L284 = Steps per revolution
L286 = L287 number of revolutions (measuring range; 1.0 for single-turn encoders)
L300 = 0298 set calibration after power-on delayed
Position actual value, encoder = c292
L158 = 2 Type: SSI or EnDat connected directly to T400 term.
L160 = Number of cuts per revolution
L161 = Number of revolutions (0 for single-turn encoders)
L295 = 3181 Source, absolute position
L298 = 0179 Position value, if no error has been recognized
L300 = 0298 Set calibration valid if the position value is valid
Position actual value encoder = c181
System
Rotary axis
Linear axis
No position overflows may occur when traversing the complete travel.
➢ Move the knife slide to the start of the traversing travel (for the quiescent position)
➢ Encoder position actual value (refer above) must be greater than 0
➢ Move the knife slide to the end of the traversing distance
➢ The position actual value (refer above) must be less than the number of revolutions of the multiturn encoder
If required, rotate the encoder until the conditions are fulfilled.
Correct the zero offset
➢ Move the kife to the required zero position.
➢ L542 = 0 referencing velocity = zero
➢ Initiate referencing (shears control word 1 = 0x0050)
➢ Referencing completed (shears control word 1 = 0x0000)
=> Offset position value is saved
CAUTION: After commissioning has been completed, it is not permissible to output any referencing command, otherwise the zero setting will be changed! For operation without automation, set L631 to 0 (Chart 810).
End, absolute value encoder


TR encoder
TR absolute value encoders are incremental encoders, which, when requested, output the actual absolute position as a sequence of pulses at tracks A and B (refer to Chart 165) via binary input (digital input) (load input) of the encoder.
L158 = 1 enable operation with TR encoder
L141= 0592 read-in the starting position with referencing request
Connect connector 0148 with the encoder load input via the digital output
Connect L140 with the digital input (connected with the load output of the encoder)
End, TR encoder


Format controller
Define the 1st cutting instant:
Connect H200 with the cutting pulse (for rotary axis, knife zero pulse, 0413)
Linear axis
System
Rotary axis
3438
H197 =
3441
Present
Pass marks
None
Cut error =
knife position - reference position - 1
H185 = 3414 knife position
H178 = 3436 reference position
H195 = 3001 fixed value 1.0
Cut error =
knife position - reference position
H185 = knife position
H178 = reference position
Cut error =
format setpoint - reference position at zero pulse of the knife
H185 = 3630 setpoint format
H178 = 3440 reference position for zero pulse
Define max. correction range (normalized to Fsymech)
set H180 > 0 (e.g. 0.1)
set H181< 0 (e.g. -0.1)
H179 integrating time; if required, increase until controller output d183 is stable.
End, format controller

**Attention:** The zero pulse of the encoder for the shear position must be active if the shear is in the center of cutting range. This zero pulse must reset shear position and material position.



# 7.2 Parameterizing the basic drive

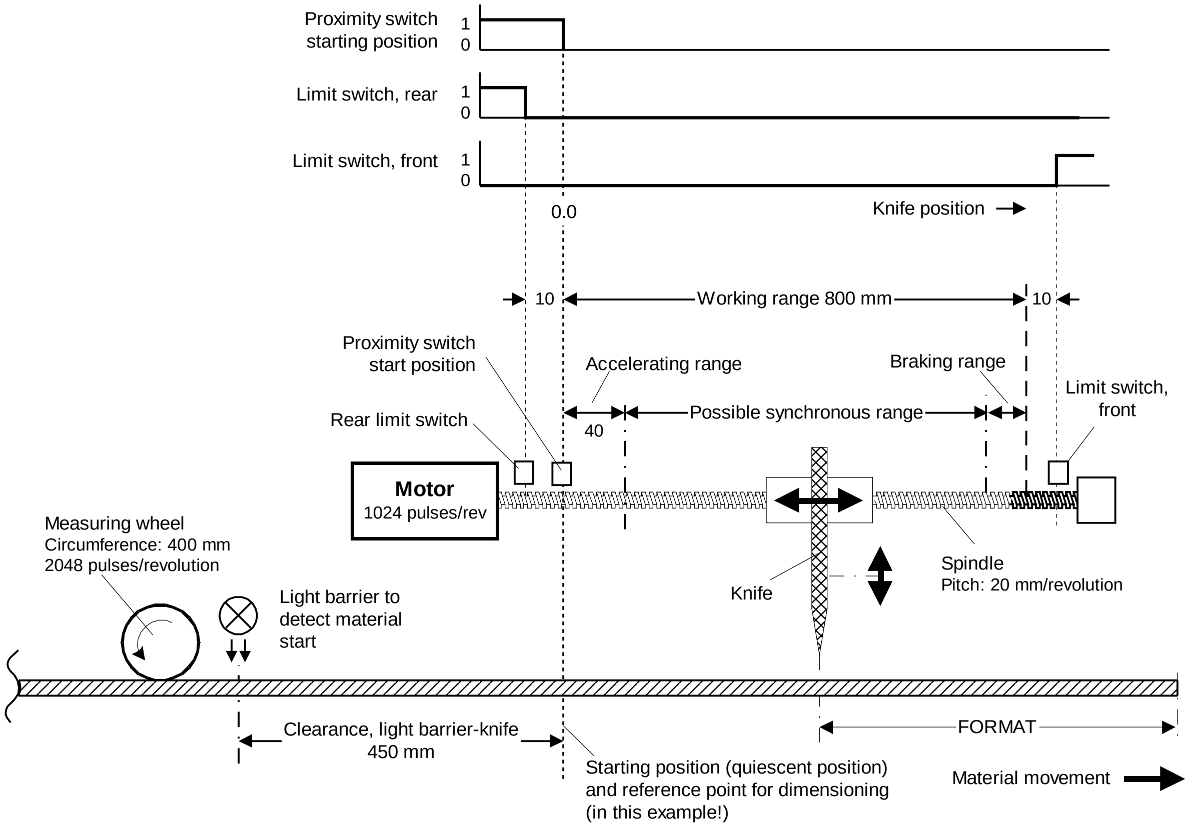
| Purpose | CUMC | CUVC | CUDC |
|---|---|---|---|
| Status word 1 as PZD1 at T400 | P734.1 = 32 | P734.1 = 32 | U734.1 = 32 |
| Actual speed as PZD2 at T400 | P734.2 = 91 | P734.2 = 91 | U734.2 = 40 |
| Torque | P734.5 = 241 | P734.5 = 241 | U734.5 = 142 |
| Control type: Closed-loop speed control; vector control | P367 = 3<br>P290 = 0 | P100 = 4 | |
| Main setpoint PZD2 from T400 (for DC Master: Bypass ramp-function generator and speed setpoint limiting) | P443 = 3002 | P443 = 3002 | P625 = 3002 |
| De-activate ramp-function generator | P462 = 0 s<br>P464 = 0 s<br>P469 = 0 s | P462 = 0 s<br>P464 = 0 s<br>P469 = 0 s | refer to main setpoint |
| Reference speed (this must be greater than 150 RPM; if required, increase H104 V_rated) | P353 = d119 | P353 = d119 | H143 = d119 |
| Bits for control word 1 | P554 = 3100<br>P555 = 3101<br>P558 = 3102<br>P564 = 3106<br>P565 = 3107<br>P568 = 3108<br>P569 = 3109<br>P575 = 3115<br>P585 = 3409 | P554 = 3100<br>P555 = 3101<br>P558 = 3102<br>P564 = 3106<br>P565 = 3107<br>P568 = 3108<br>P569 = 3109<br>P575 = 3115<br>P585 = 3409 | P654 = 3100<br>P655 = 3101<br>P658 = 3102<br>P664 = 3106<br>P665 = 3107<br>P668 = 3108<br>P669 = 3109<br>P675 = 3115<br>P685 = 3409 |
| Remove speed setpoint limiting | P452 = 200 %<br>P453 = -200 % | P452 = 200 %<br>P453 = -200 % | refer to the main setpoint |
| De-activate smoothing for speed setpoint and actual value | P221 = 0 ms<br>P223 = 0 ms | P221 = 0 ms<br>P223 = 0 ms | refer to the main setpoint |
| Supplementary torque PZD5 from T400 (optional) | P262 = 3005 | P506 = 3005<br>P473 = 0 | P502 = 3005 |
| Set torque limits to maximum | P263 = 200 %<br>P264 = -200 % | P492 = 200 %<br>P498 = -200 % | P171 = 200 %<br>P172 = -200 % |
| Data transmission task cycle between T400 and drive | U950.11 = 2 | U950.11 = 3 | |

Prerequisite is that the basic drive has been commissioned, including all of the parameters have been set which define the motor.

## 7.3 Troubleshooting

| Problem | Possible cause | Remedy |
|---|---|---|
| Knife drive rotates in the incorrect direction | 1. Encoder tracks interchanged<br>2. Direction revised per software (observe zero pulses; refer to the following problem profile) | 1. Interchange encoder tracks A, B<br>2. H401 = 3402<br>H318 = -1.0<br>H780 = -1.0 |
| Rotary axis: Knife and material position are reset by the same synchronizing pulse. Torque surges sporadically occur. | 1. The two position sensing functions (knife and material) use different synchronizing signal edges (phase sequence, tracks A and B of the encoder are different); the position values are then not simultaneously reset. | 1. Always use the rising (front) edge of the synchronizing pulse.<br>H408 Bit2 = 1 (e.g. H408 = 0x0004)<br>H428 Bit2 = 1<br>CAUTION: Both bits must be identical! |
| Cut length incorrect | 1. Format setpoint (reference value) is not transferred (d630 is not equal to the format which has been entered)<br>2. Format shorter than possible (c348, B1348 briefly to '1')<br>3. Incorrect position normalization for knife or material<br>4. Measuring wheel slip | 1. Set the length setpoint to valid (SCTW1.4, [270,8] ) ;<br>Remove limits (H627, H628);<br>Locate the calculation position H649 in the operating range;<br>Allow format constant calculation (H172 ... H173)<br>2. Reduce the material velocity<br>3. Check the position sensing; Changes made to H400, H407, H408, H420, H428, H429 only become effective after the T400 has been **powered-down**!<br>4. Compensate slip using a factor at H121 |
| Shears to not stop after "cont. cut" has been withdrawn (SCTW1.2) | 1. "Longitudinal format" too short<br>2. Calculation position is not within the operating range (no changeover to "longitudinal format" to stop; refer to d630)<br>3. "Knife in the starting position" not received | 1. Set H111 to the format with delay interval of 0.5 s between 2 cuts + clearance to the material detection.<br>2. Locate H649 in the operating range<br>3. Knife position fluctuates around the starting position (increase range H642; "smooth" closed-loop position control) |
| Brief events are not always recognized | 1. Transfer pulses which are too short from a fast into a slower sampling time<br>2. Processing sequence of freely-assigned blocks was not observed | 1. Pulses < 25 ms from T1 to T3 should be extended to 2*T3 (e.g. zero pulses from the encoder)<br>2. The sampling time and sequence of freely-assigned blocks must be observed! (refer to function charts) |
| "In the synchronous range" becomes active after re-positioning | 1. For linear axes, the knife cannot re-enter the synchronous range (cutting range) for a reverse movement | 1. Locate the range limit (H451) to a position outside the operating range |

# 7.4 Example of “cut to length”




| Involves | Description / required behavior |
|---|---|
| Hardware constellation | T400 in the SRT400. Speed interface: ±10V analog signal (100% = 8 V). |
| System velocity | Up to 60 m/min |
| Cut duration | Max. 500 ms |
| Cut monitoring | There is no checkback signal for the knife position. The cutting tool immediately returns to the quiescent position after the cut. |
| Cut start | 50 ms after synchronism has been achieved |
| End of cut | After the max. cutting duration has expired + 50 ms safety margin.<br>It then immediately returns to the starting position. |
| Clamps | Clamps are controlled when synchronism has been reached. Duration, 400 ms. |
| Format input | The cut format is not changed during operation. |
| Material start | 100 mm should be cut from the start of the material. |
| Manual cut, automatic operation | The cut is executed immediately after request. The cut length is not defined.<br>The knife must be located in the starting position! |
| Manual cut, automatic mode disabled | This is only permissible when the material and slides are at a standstill. Any slide position. |
| Referencing | Automatic after the automatic mode has been activated. |

| Interfaces | Connection | Terminal | Ground | Type |
|---|---|---|---|---|
| Enable | 0241 | 53 | 61 | Digital input |
| Jogging, forwards | 0242 | 54 | 61 | " |
| Jogging, reverse | 0243 | 55 | 61 | " |
| Automatic mode | 0244 | 56 | 61 | " |
| Manual cut | 0245 | 57 | 61 | " |
| Limit switch, rear | 0246 | 58 | 61 | " |
| Limit switch, front | 0247 | 59 | 61 | " |
| Limit, switch, starting position | 0249 | 83, 84 | 61 | " |
| Light barrier, start of material | 0250 | 65 | 66 | " |
| Control signal for cutting | H269 | 51 | 50 | Digital output |
| Control signal for clamping | H270 | 52 | 50 | " |
| Fault message | H271 | 46 | 50 | " |
| Speed setpoint, spindle drive | H220 | 97 | 99 | Analog output |
| Incremental encoder, wheel | | 62, 63 | 85 | HTL input |
| Incremental encoder, spindle drive | | 81, 82 | 66, 86,87,88 | HTL input |

## 7.4.1 System specifications

| Par. | Value | Function | Plan |
|---|---|---|---|
| H100 | 40 | The knife position is normalized to the length of the accelerating travel (40 mm) | 60, 1 |
| H101 | 0 | Synchronizing ramp starts at knife position 0 | 60, 1 |
| H102 | 40 | Synchronizing ramp ends at knife position 40 ( set H102 ≤ H100) | 60, 1 |
| H103 | 0 | Synchronizing ramp starts at knife position 0 | 60, 5 |
| H104 | 60 m/min | System reference velocity | 80, 4 |
| H105 | 40 | The material position is normalized to the length of the accelerating travel (40 mm) | 60, 5 |
| H122 | 450 mm | Distance between the material detection and reference point | 60, 6 |
| H115 | 400 mm | Measuring wheel circumference | 80, 1 |
| H117 | 20 mm | Feed of the knife slide per motor revolution | 80, 1 |
| H120 | 1 | Operation with linear axis | 410, 1 |
| H154 | 2 | Curve type 2 (linear ramp with rounding-off) | 200, 4 |
| H197<br>L201 | 3441<br>3168 | Shift the coordinate system for the reference position by Fsymech (40 mm). This means that the reference position has the value "actual format" when the cut position reaches the quiescent position of the knife. This simplifies the input of material position-dependent dimensions (e.g. the distance between the material start detection and the knife quiescent position can be measured) | 200, 1 |
| H451 | 3662 | Shifts the lower range limit of the synchronous range monitoring to a value outside the traversing distance (-1000 mm). (For linear axes, the knife slide cannot enter the synchronous range when reversing out of the quiescent position) | 330, 2 |
| H642 | 0.025 | Tolerance bandwidth to identify "in start position" to 0.025 · 40 mm = 1 mm | 340, 2 |
| H715 | 0 | Min. position of the knife slide 0 mm | 480, 1 |
| H717 | 800 | Max. position of the knife slide, 800 mm | 480, 1 |
| H718 | 10 | 10 mm tolerance bandwidth to the knife position monitoring (to initiate a fault) | 480, 3 |
| L574 | 3617 | Reduces the reference velocity to zero at the end of the traversing distance | 250, 5 |
| H220 | 3779 | Speed setpoint output at analog output 1 | 95, 1 |
| H225 | 0,625 | Scaling, analog output 1 to output 1.0 as 8 V | 95, 5 |

## 7.4.2 Format setpoint

| Par. | Value | Function | Chart |
|---|---|---|---|
| H619 | 2004 | Select fixed format 1 as format request | 190, 6 |
| H621 | xxxx mm | Enter the required cut format | 190, 4 |
| H110 | 100 mm | Crop length (this is cut from the start of the material) | 60, 1 |
| H511 | 1 | Set crop cut enable | 270, 2 |
| H111 | 2,5 m | Select the longitudinal format so that for this cut format, the knife remains stationary for approx. 1 s in the starting position between two cuts + H122 (450 mm) | 60, 1 |
| L198 | 0436 | If the material is stationary in the shears and for a manual cut, the material position is set to the value of the actual knife position | 180, 1 |
| L199 | 3414 | refer above, L198 | 180, 1 |

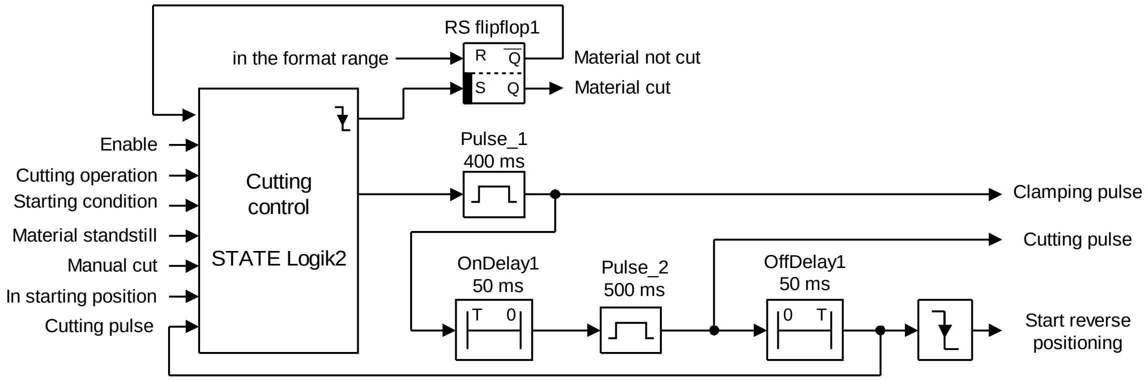
## 7.4.3 Incremental encoders

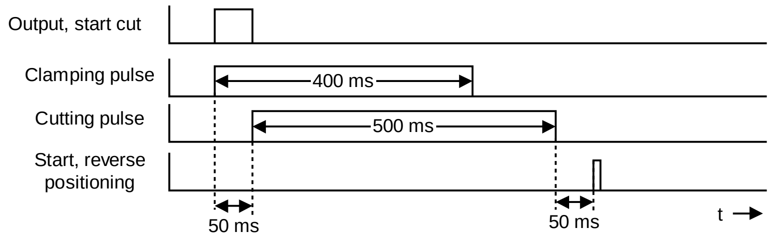
| Par. | Value | Function | Chart |
|---|---|---|---|
| H400 | 1024 | Motor for knife feed; pulses per revolution (factory setting) | 120, 3 |
| H407 | 0x7F02 | Source of the encoder tracks from terminals 81, 82 and synchronizing pulse from terminal 83 | 120, 2 |
| H408<br>H428 | 0x0004<br>0x0004 | Direction of rotation - independent of the front edge of the proximity switch signal (starting position) is used for synchronization (this is only effective, if identical to H428!) | 120, 3 |
| H405 | 0599 | Synchronization only enabled for jogging or referencing | 120, 4 |
| H420 | 2048 | Measuring wheel; pulses per revolution | 130, 3 |
| H425 | 0000 | The material position may not be set by the synchronizing pulses! | 130, 2 |

## 7.4.4 Jogging and referencing

| Par. | Value | Function | Chart |
|---|---|---|---|
| L519 | 0.05 | Velocity when jogging = 5% of 60 m/min (this results in 5 cm/s; factory setting) | 260, 1 |
| L521 | 0257 | No forwards jogging, if the "front limit switch " is occupied | 260, 2 |
| L525 | 0256 | No reverse jogging, if the "rear limit switch" is occupied | 260, 2 |
| L530 | 0259 | Reverse referencing, if "proximity switch starting position" = 0 | 260, 2 |
| L531 | 0249 | Forwards referencing, if "proximity switch starting position" = 1 | 260, 2 |
| L532 | 0000 | Initial direction of rotation is automatically obtained due to L531, L532 | 260, 2 |

## 7.4.5 Controlling the cut sequence




| Par. | Value | Function | Chart |
|---|---|---|---|
| L758 | 0245 | A pulse, min. 1000 ms is generated from the manual cut input (terminal 57) | 436, 1 |
| L759 | 1000 ms | Manual cut pulse duration | 436, 2 |
| | | **Logic to initiate a cut (logic2)** | |
| L263 | 0665 | I1 = No enable (factory setting) | 415, 5 |
| L264 | 0576 | I2 = Cutting mode (factory setting) | 415, 5 |
| L265 | 0455 | I3 = Starting condition (cutting/synchronism; Chart 330, 8) | 415, 5 |
| L266 | 0730 | I4 = Cutting pulse (OffDelay1_Q; Chart 436,3) | 415, 5 |
| L267 | 0436 | I5 = Standstill, material (n_Ref = 0; Chart 130, 8) | 415, 5 |
| L268 | 0237 | I6 = Material not cut (Chart 430, 2) | 415, 5 |
| L269 | 0644 | I7 = In the starting position (Chart 340, 4) | 415, 5 |
| L270 | 0935 | I8 = Manual cut | 415, 5 |
| L271 | 0x0026 | MS1 = Cutting mode AND start condition AND material_not _cut | 415, 6 |
| L272 | 0x0A90 | MS2 = Standstill material AND manual cut request AND cut pulse_completed AND no_cut operation | 415, 6 |
| L273 | 0x08D0 | MS3 = Standstill_material AND manual cut request AND cut pulse_completed AND in_starting position | 415, 6 |
| L275 | 0x8010 | MR1 = Standstill_material AND no_manual cut request | 415, 6 |
| L276 | 0x0000 | De-activate factory setting | 415, 6 |
| L278 | 0x0009 | MR = no_enable OR cut pulse | 415, 6 |
| | | **Pulse generation** | |
| L876 | 1279 | Clamping pulse from the output, logic 2 | 436, 4 |
| L877 | 400 ms | Clamping pulse duration | 436, 5 |
| L728 | 0876 | Derive the switch-on delay for the cutting pulse from the clamping signal | 436, 1 |
| L729 | 50 ms | Duration of the switch-on delay for the cutting pulse | 436, 2 |

| Par. | Value | Function | Chart |
|---|---|---|---|
| L878 | 0728 | Source for the cutting pulse = output OnDelay1 | 436, 4 |
| L879 | 500 ms | Cut pulse duration | 436, 5 |
| L730 | 0878 | Source, switch-off delay for the end of cut identification from the cut pulse | 436, 1 |
| L731 | 50 ms | Duration, switch-off delay for the end of cut identification | 436, 2 |
| L709 | 0730 | Source of the edge generation at the end of cutting = OffDelay1 | 430, 4 |
| H269 | 0878 | Connect digital output, terminal 52 with the clamping pulse | 100, 1 |
| H270 | 0876 | Connect digital output, terminal 51 with the cut pulse | 100, 1 |

| Par. | Value | Function: Initiating a manual cut | Chart |
|---|---|---|---|
| H933 | 0576 | I1 = Cutting operation (Chart 320, 5) | 421, 1 |
| H934 | 0644 | I2 = in the starting position (Chart 340, 4) | 421, 1 |
| H935 | 0758 | I3 = Manual cut request | 421, 1 |
| H937 | 0x0007 | MS1 = Cutting operation AND in_starting position AND manual cut request | 421, 2 |
| H938 | 0x0104 | MS2 = no_cutting operation AND manual cut request | 421, 2 |
| H940 | 0x0400 | MR = no_manual cut request | 421, 3 |
| L195 | 0935 | Set the material position to initiate a manual cut in the automatic mode | 180, 1 |

### 7.4.6 Return positioning

| Par. | Value | Function | Chart |
|---|---|---|---|
| L331 | 0665 | I1: Not enabled (factory setting) | 410, 2 |
| L332 | 0644 | I2: in the starting position (factory setting) | 410, 2 |
| L333 | 0576 | I3: Cutting operation (factory setting) | 410, 2 |
| L334 | 0708 | I4: End of the cutting pulse | 410, 2 |
| L336 | 0499 | I6: Positioning active (factory setting) | 410, 2 |
| L337 | 1347 | I7: Positioning mode (factory setting) | 410, 2 |
| L339 | 0x020C | MS1: Cutting operation AND end_of the_cut pulse AND not_in_start position | 410, 3 |
| L343 | 0x2040 | MR1: Positioning_not_active AND mode_positioning | 410, 3 |
| L346 | 0x0001 | MR: No_enable | 410, 4 |
| L196 | 1348 | Fault processing if the knife isn't at the starting position on time; this means that larger formats (sheets) are cut than specified! | 180, 2 |
| H481 | 625 1/s² | Angular acceleration of the slide drive (in 40 mm up to 60 m/min = 1 m/s)<br>$a = \frac{v^2}{2 \cdot X} = \frac{60 \, {}^{m}/_{\min}}{2 \cdot 40mm} = 12.5 \, {}^{m}/_{s^2} \rightarrow \dot{f} = \frac{a}{20 \, {}^{mm}/_{U}} = 625 \, {}^{U}/_{s^2}$ | 230, 3 |
| H478 | 30000 1/s³ | Rounding-off: The torque is established when accelerating<br>(time to establish the torque: H481 / H478 = 20 ms) | 230, 4 |
| H479 | 15000 1/s³ | Final rounding-off: The torque is reduced when braking down to standstill<br>(time to reduce the torque: H481 / H479 = 40 ms) | 230, 4 |

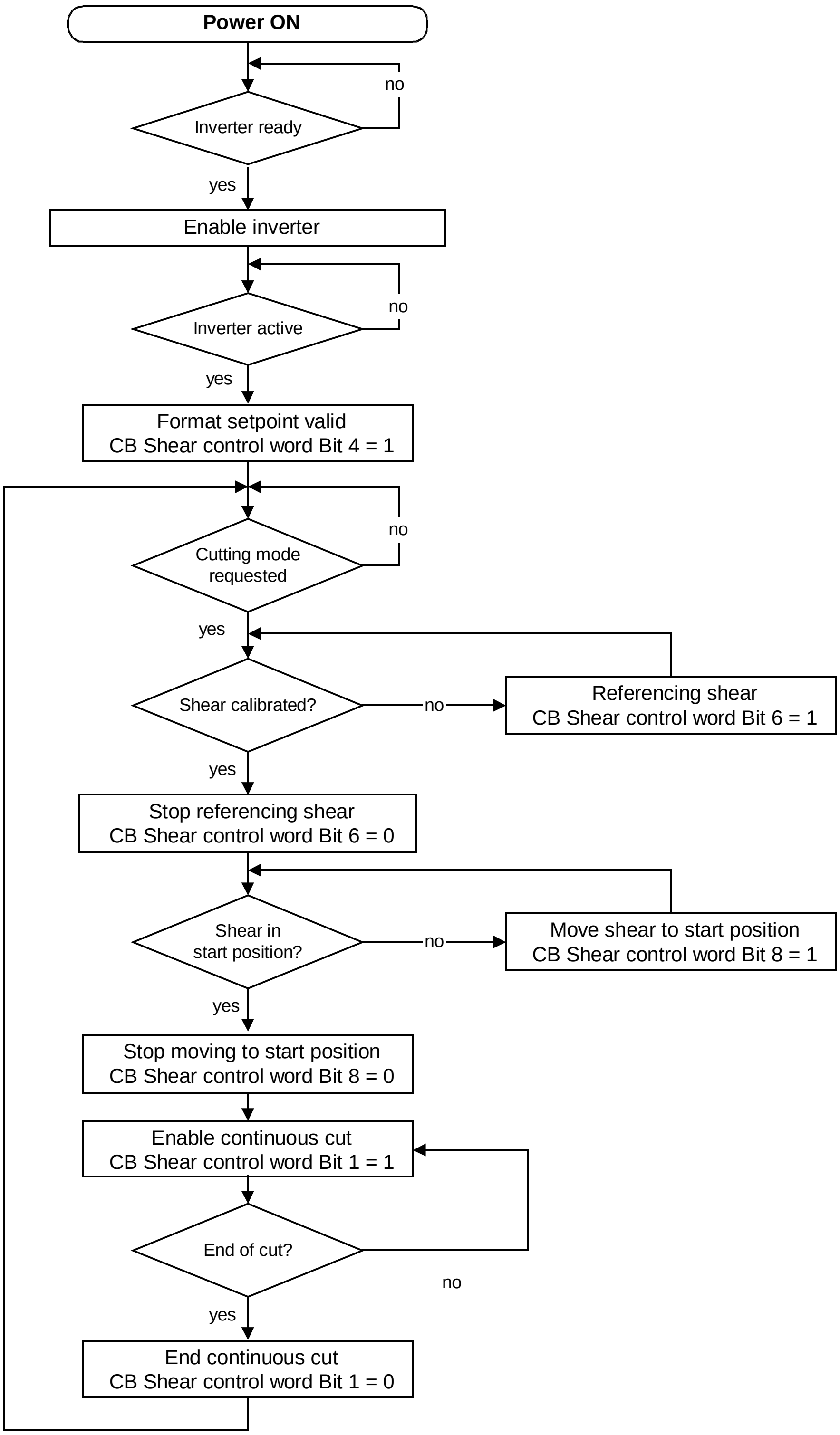
### 7.4.7 T400 operation without external automation system

| Par. | Value | Function | Chart |
|---|---|---|---|
| H841 | 2621 | Internally generate control word 1 for the drive converter | 680, 1 |
| H844 | 2622 | Internally generate shears control word 1 | 680, 5 |
| L620 | 0241 | "Enable" from terminal 53 | 810, 1 |
| L626 | 0244 | "Automatic mode" from terminal 56 | 810, 1 |
| L627 | 0635 | Only enable automatic mode, if the drive converter is operational (e.g. no fault) | 810, 1 |
| H653 | 0001 | Simulate drive converter ready | 360, 2 |
| H654 | 0001 | Simulate drive converter ready | 360, 1 |
| L621 | 0001 | Simulate drive converter ready | 810, 2 |
| H656 | 0013 | Ready to run only if no fault is present | 360, 1 |
| H581 | 0627 | Acknowledge fault by withdrawing the enable signal at terminal 53 | 530, 4 |
| H966 | 0x30E0 | Suppress non-relevant faults/error bits in the fault word | 530, 4 |
| H967 | 0x30E0 | Suppress non-relevant fault bits in the alarm word | 530, 4 |

### 7.4.8 Diagnostics

| Par. | Value | Assigning free bits in the shears status word | Chart |
|---|---|---|---|
| H548 | 0876 | Clamping pulse | 520, 1 |
| H549 | 1279 | Positioning | 520, 2 |
| H550 | 0878 | Cut pulse | 520, 1 |
| H551 | 0730 | Extended cut pulse (OffDelay1) | 520, 2 |
| H552 | 0632 | Automatic mode | 520, 1 |
| H553 | 0250 | Light barrier, material detection | 520, 2 |

## 7.5 Function flow PLC (principle)



# Function charts for the standard software package Sheet Cutter/Cut to Length


| Contents | Chart |
|---|---|
| **General** | |
| Contents | 10 |
| Block diagram control | 20 |
| Block diagram shear controller | 25 |
| General symbols | 30 |
| Control symbols | 35 |
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| Configuration setting | 50 |
| General constants | 60 |
| Fixed values | 70 |
| Pulse encoder normalizations | 80 |
| **T400** | |
| Analog inputs | 90 |
| Analog outputs | 95 |
| Binary outputs and bidirectional I/O | 100 |
| Binary inputs | 110 |
| **Position sensing** | |
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| Reference position (material) | 130 |
| Displacement correction and pass mark counter | 135 |
| Suppressing pass marks (position-dependent) | 140 |
| Correction of reference position | 145 |
| Absolute-value encoder on T400 and normalization | 150 |
| Absolute-value encoder (CU) | 160 |
| TR encoder | 165 |
| Calibrate shear | 170 |
| Set reference position | 180 |

| Contents | Chart |
|---|---|
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| Format setpoint selection | 190 |
| Format generator (FGEN) | 200 |
| Position controller (PC) | 210 |
| Format controller (FC) | 220 |
| Positioning with ramp generator (PosRG) | 230 |
| Torque calculation | 240 |
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| Speed local modes and setpoint for inverter | 260 |
| Cut curve and overspeed | 265 |
| **Control logic** | |
| Shear control word 1 (SCTW1) | 270 |
| Shear control word 2 (SCTW2) | 280 |
| Operation mode priority | 290 |
| Operation modes 1 | 300 |
| Operation modes 2 | 310 |
| Operation modes 3 | 320 |
| Range monitoring 1 | 330 |
| Range monitoring 2 | 340 |
| Range monitoring 3 | 350 |
| Enable inverter / setpoints / controller | 360 |
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| Cam group | 380 |
| **Free function blocks** | |
| Definition of the logic function block STATE | 400 |
| Mode switching (positioning/format mode) | 410 |
| Parameterizable logic 1 (raise/lower knife) | 415 |
| Parameterizable logic 2 | 420 |
| Parameterizable logic 3 | 421 |
| AND/OR gates | 425 |
| Miscellaneous functions | 430 |
| Control functions | 435 |
| Time dependent functions | 436 |
| Type conversion | 440 |
| Arithmetics | 445 |

| Contents | Chart |
|---|---|
| **Diagrams** | |
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| Friction and inertia | 460 |
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| Display parameters | 540 |
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| General settings | 600 |
| Process data reception | 610 |
| Inverter status words | 620 |
| Control words | 630 |
| Process data transmission | 640 |
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| Process data reception | 670 |
| Control words | 680 |
| Status words | 690 |
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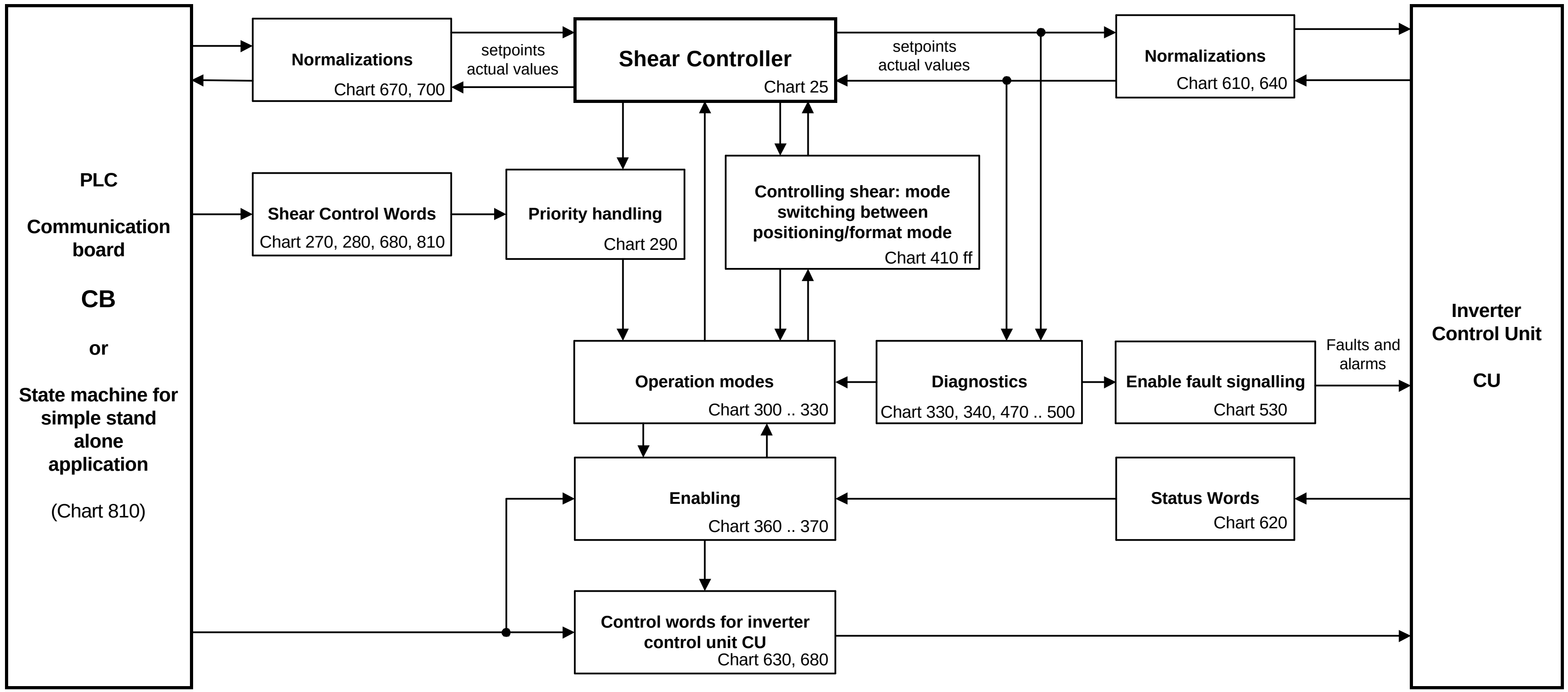
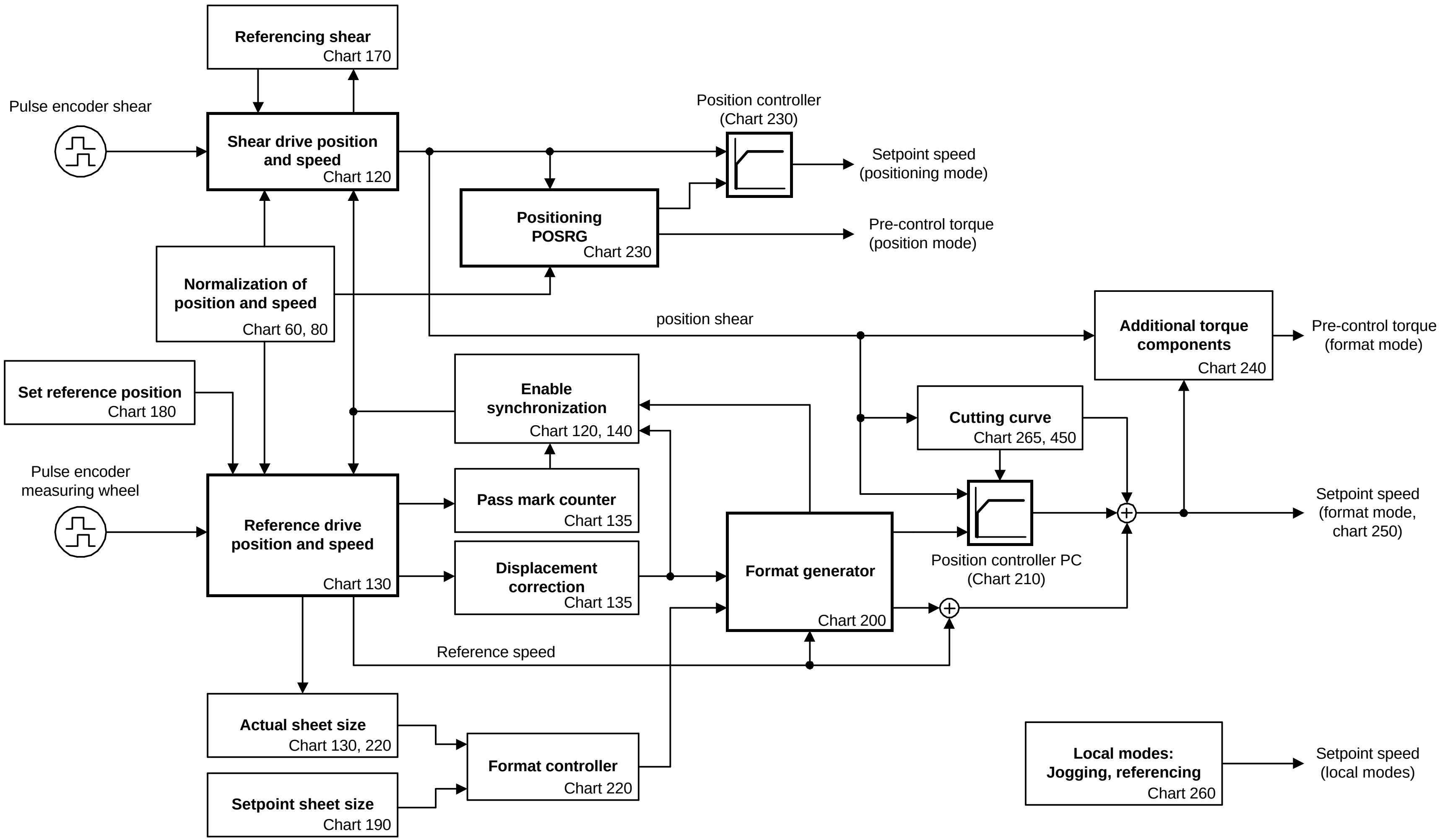
| USS slave | 770 |
| Generel settings peer to peer | 780 |
| Peer to peer process data | 790 |
| **Test operation** | |
| Multiplexer selected fixed values | 800 |
| Startup state machine | 810 |




| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| General | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 20 - |
| Block diagram control | | | | | 10.01.01 | Sheet cutter / Cut to Length | |




| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| General | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 25 - |
| Block diagram shear controller | | | | | 10.01.01 | Sheet cutter / Cut to Length | |

## Technology parameters

| Symbol | Explanations |
|---|---|
| Parameter name (factory setting) Hxyz | Technology parameter e.g. H231 |
| Parameter name dxyz | Display parameter e.g. d123 |
| Parameter name H123 (fact.) KR (chart) | Connection to a floating-point source (fact.) which can be modified with H123 |
| Parameter name H123 (fact.) K (chart) | Connection to a integer source (fact.) which can be modified with H123 |
| Parameter name H234 (fact.) B (chart) | Connection to a boolean source (fact.) which can be modified with H123 |

**Excample:**

Parameter name (factory setting)

S.Setpoint speed

Parameter number H123 (3412) KR (120,7)

Data type symbol:
B BOOL
K 16bit
KK 32bit
KR floating point

(chart, Sector) for factory setting

## Logic and arithmetics

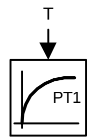
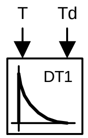
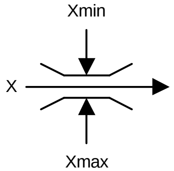
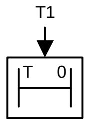
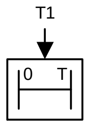
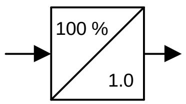
| Symbol | Explanations |
|---|---|
| ≥ 1 | OR operation Inputs and outputs may be of binary or vector data type |
| & | AND operation Inputs and outputs may be of binary or vector data type |
| 1 | Logical inversion |
| X1, X2 → × → Y | Multiplication $Y = X1 * X2$ |
| X1, X2 → ÷ → Y | Divider $Y = \frac{X1}{X2}$ |
| X1, X2 → + → Y | Adder $Y = X1 + X2$ |
| X → \|X\| → Y | Absolute value $Y = \| X \|$ |
| X → -1 → Y | Negation $Y = - X$ |

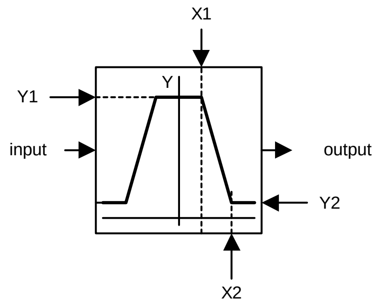
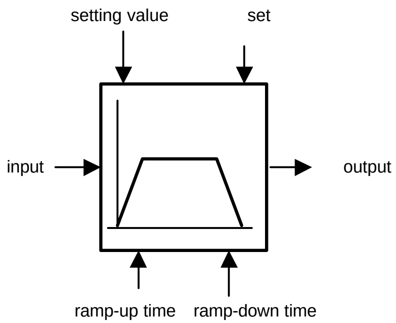
## Miscellaneous

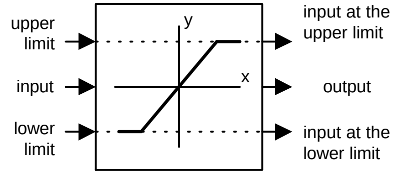
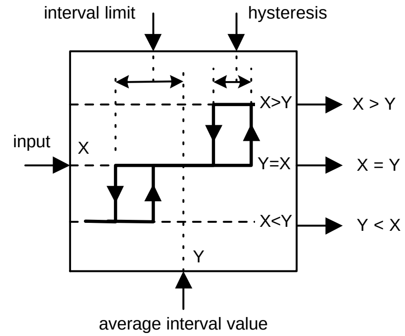
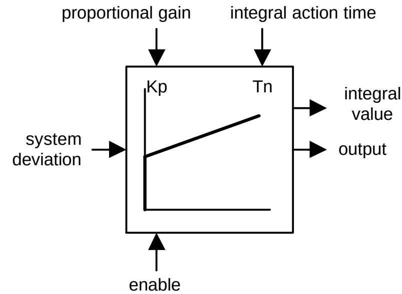
| Symbol | Explanations |
|---|---|
| Selection; inputs 0, 1, 2, 3, 4 | Multiplexer (here 5 inputs) |
| Selection; 0, 1 | Selcetion between 2 inputs |
| + - | Operational amplifier |
| X → 1 / 0 → Y | Sign determination $Y = sign ( X )$ |
| X → Y | Edge detektor generates a pulse for the rizing edge of X |
| A+, A-, B+, B-, N+, N-; Coarse pulse | Inkremental encoder Here: tracks A, B and zero pulse N; (RS422) |

## Miscellaneous

| Symbol | Explanations |
|---|---|
| Set → S Q; Reset → R Q | R-S-Flip-Flop |
| S; X → S&H → Y | Sampling 1 value X storage value Y store value S storage condition |

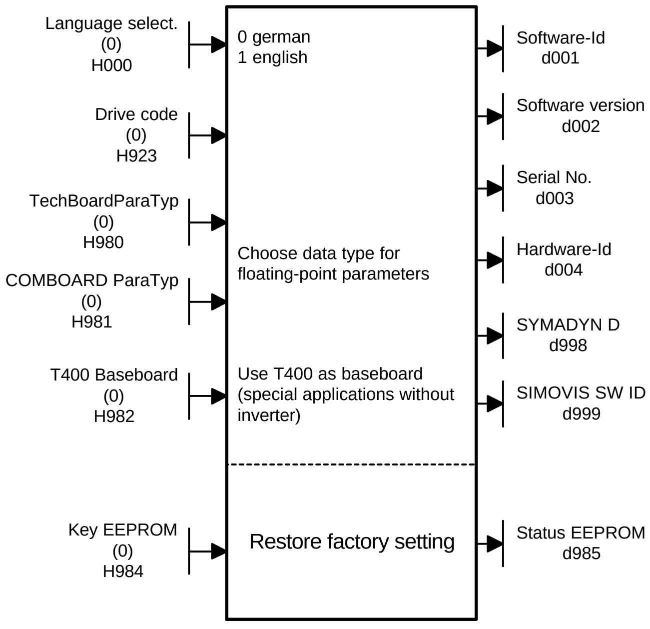
| Symbol | Explanations |
|---|---|
|  | Low pass filter<br>T time constant |
|  | High pass filter<br>T = smooting time constant<br>Td = derivative action time constant |
|  | Limiter function<br><br>Xmin <= X <= Xmax |
|  | Switch on delay T1 |
|  | Switch off delay T1 |
|  | Converter<br>here: fixed point to floating point<br>(100% converted to 1.0) |

| Symbol | Explanations |
|---|---|
|  | Curve defined by 2 points (X1,Y1) and (X2,Y2)<br><br>symmetrical to the Y-axis |
|  | Ramp function with setting function |
| | |

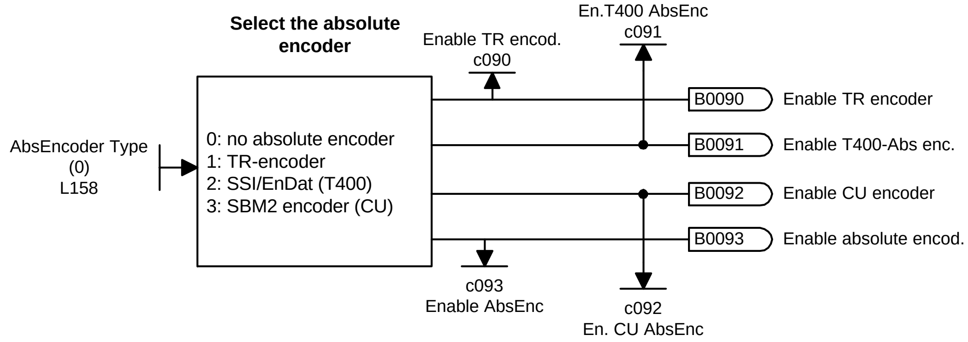
| Symbol | Explanations |
|---|---|
|  | Limiter<br><br>signalling if the input quantity exceed the limits |
|  | Limit value monitor with hysteresis |
|  | PI controller |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|

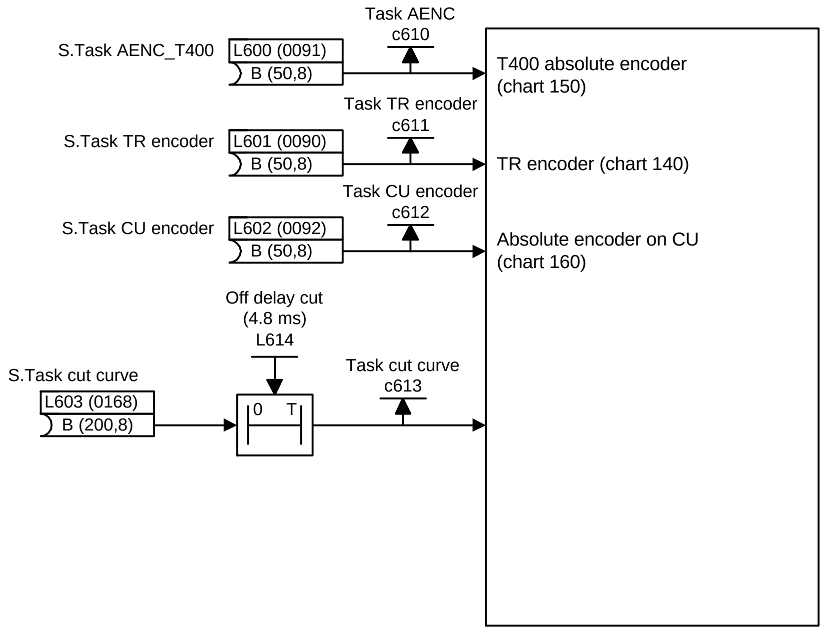
## General settings




## Select the absolute encoder




## Disabling of special tasks

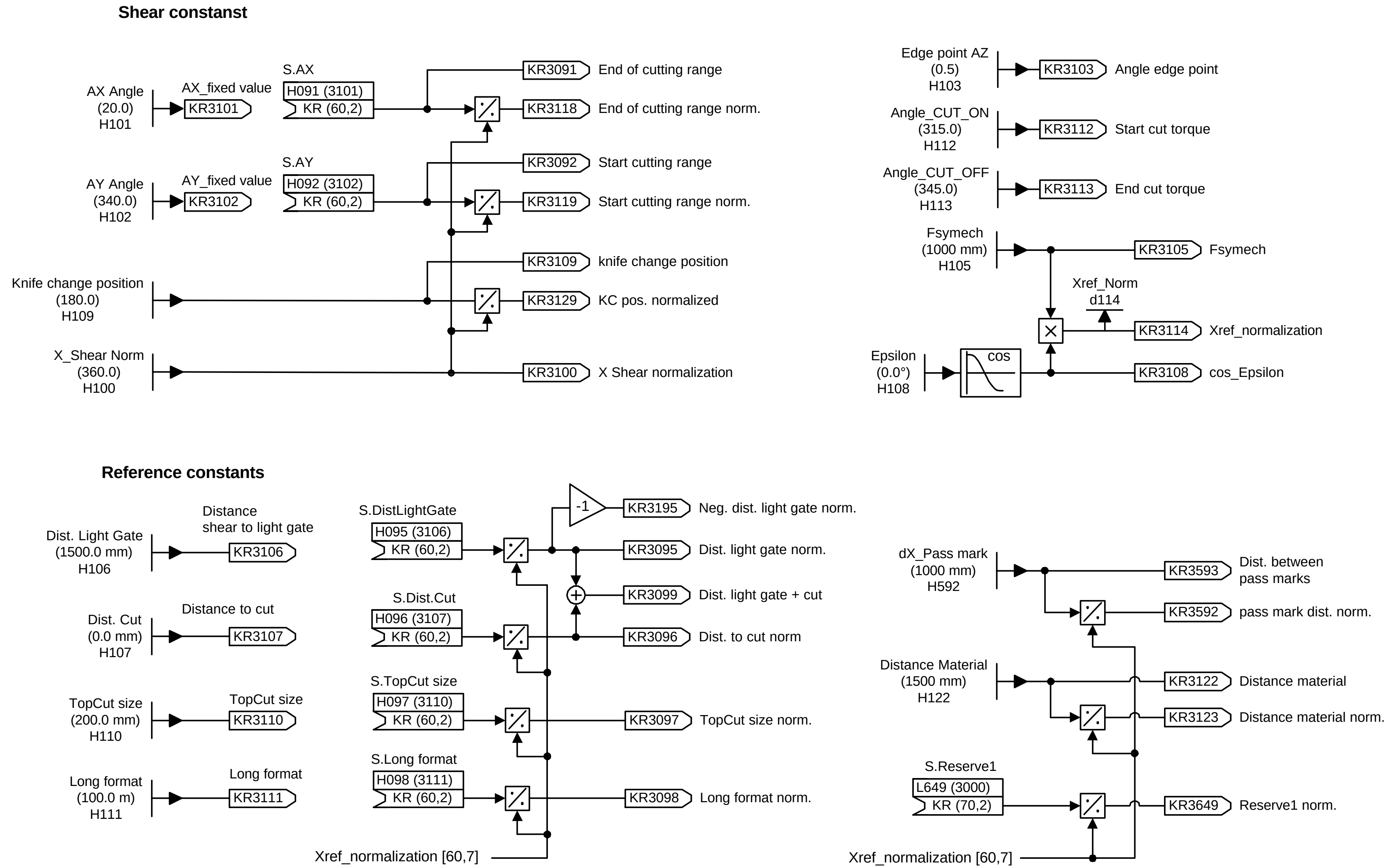



**Restore factory setting**

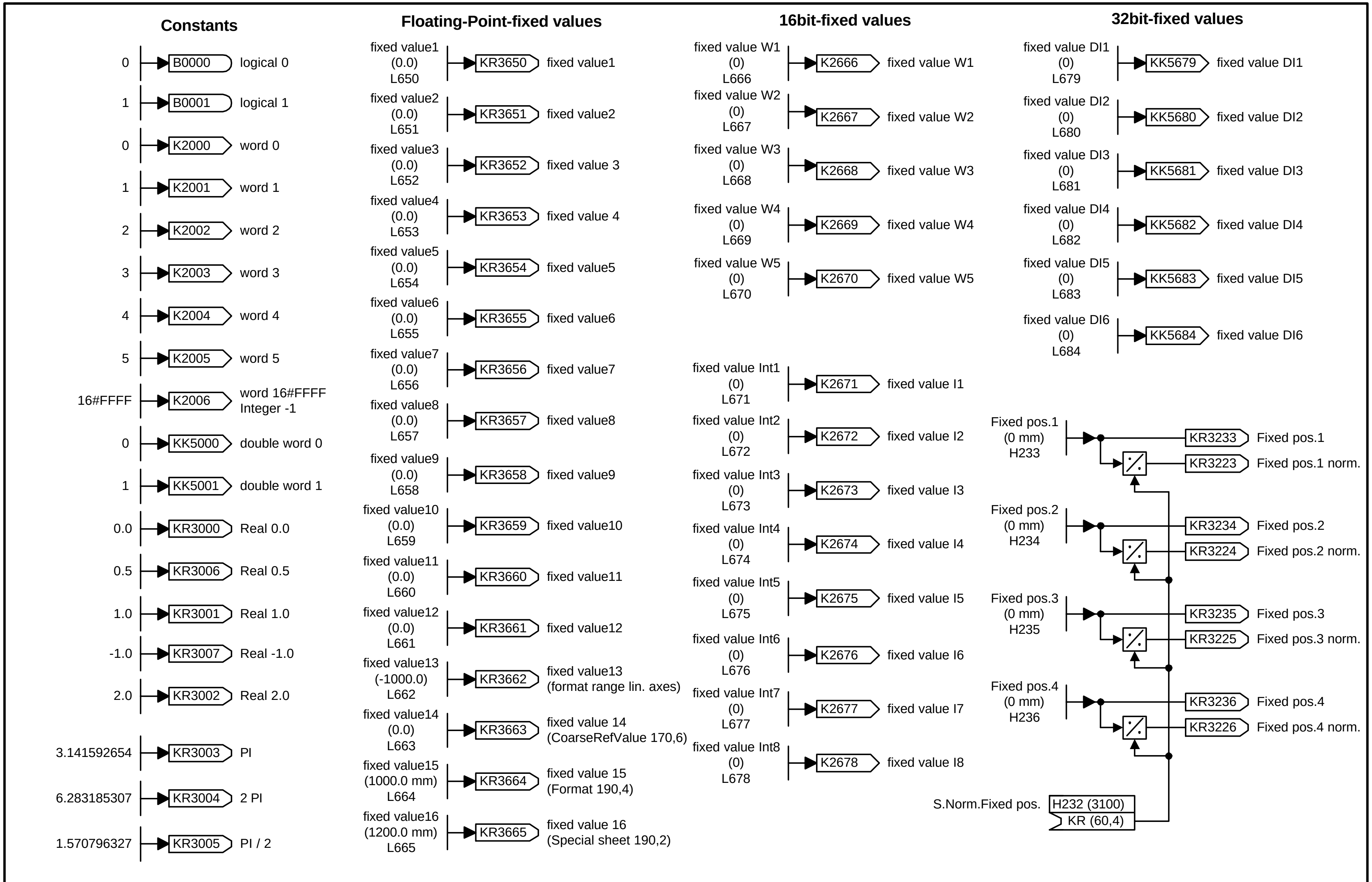
Set H984 = 165

Modified parameters are restored to factory setting.

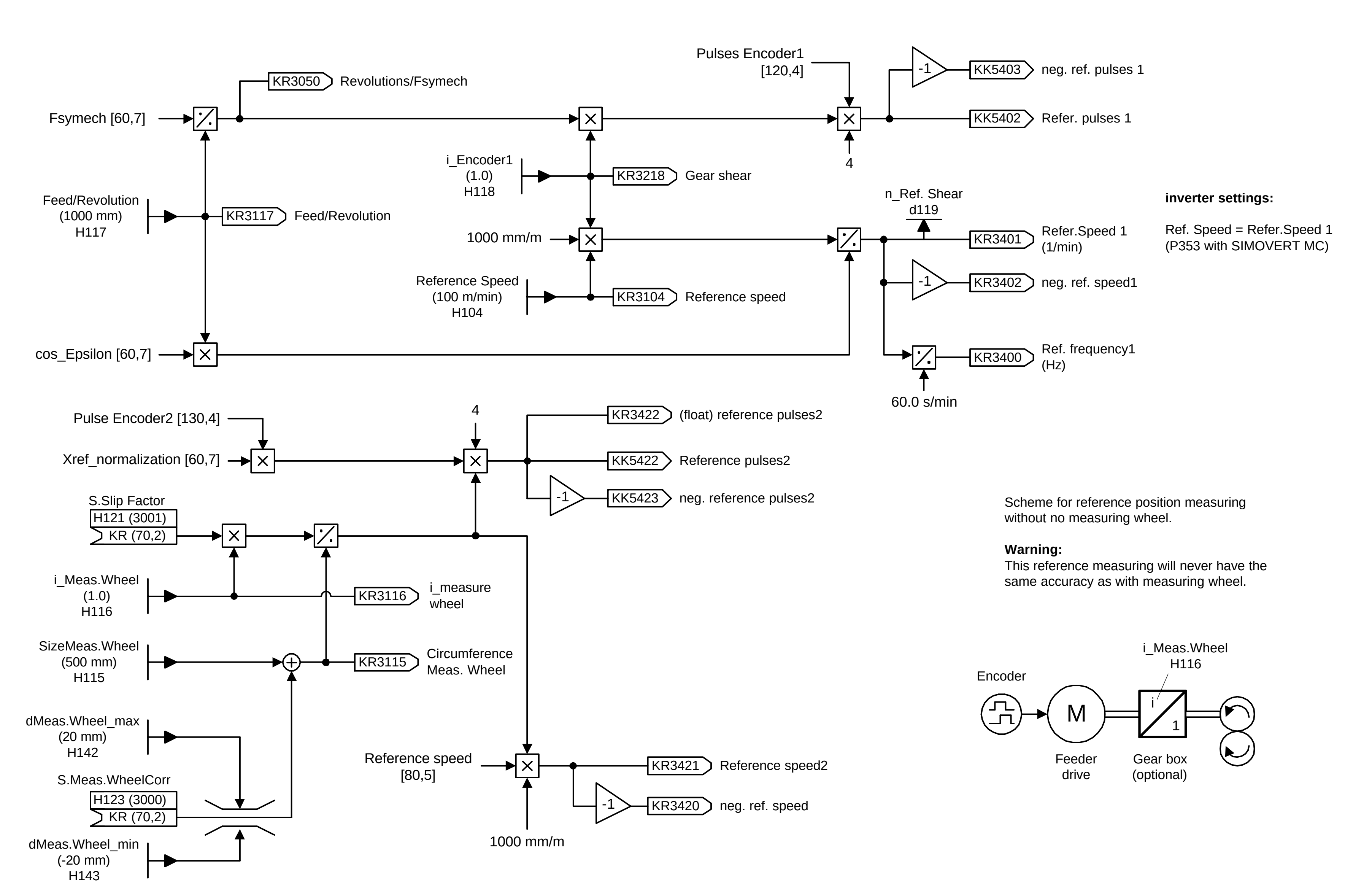
This operation can not be canceled!



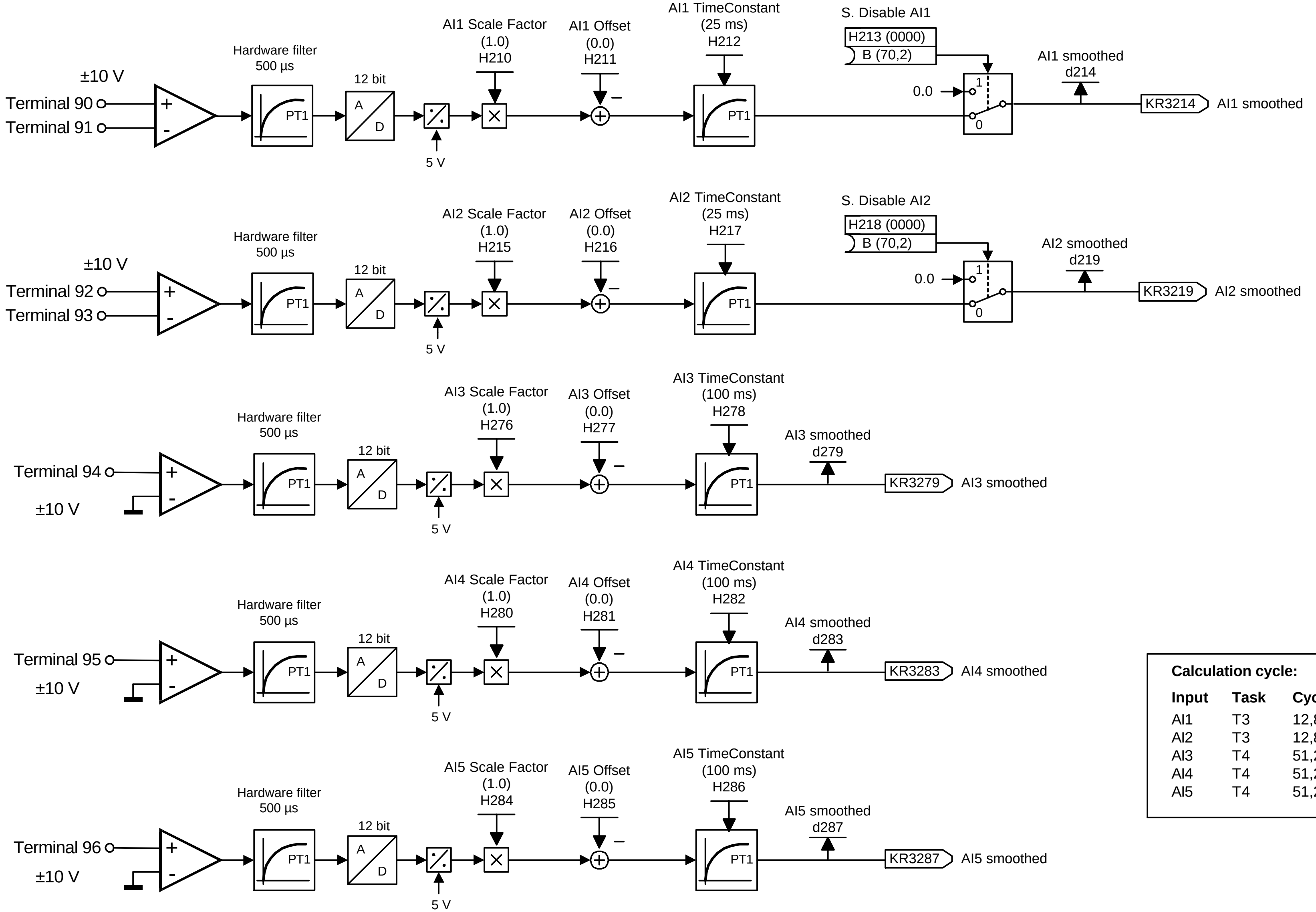

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Constant | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 60 - |
| General constants | | | | | 10.01.01 | Sheet cutter / Cut to Length | |




| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Constant | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 70 - |
| Fixed values | | | | | 10.01.01 | Sheet cutter / Cut to Length | |



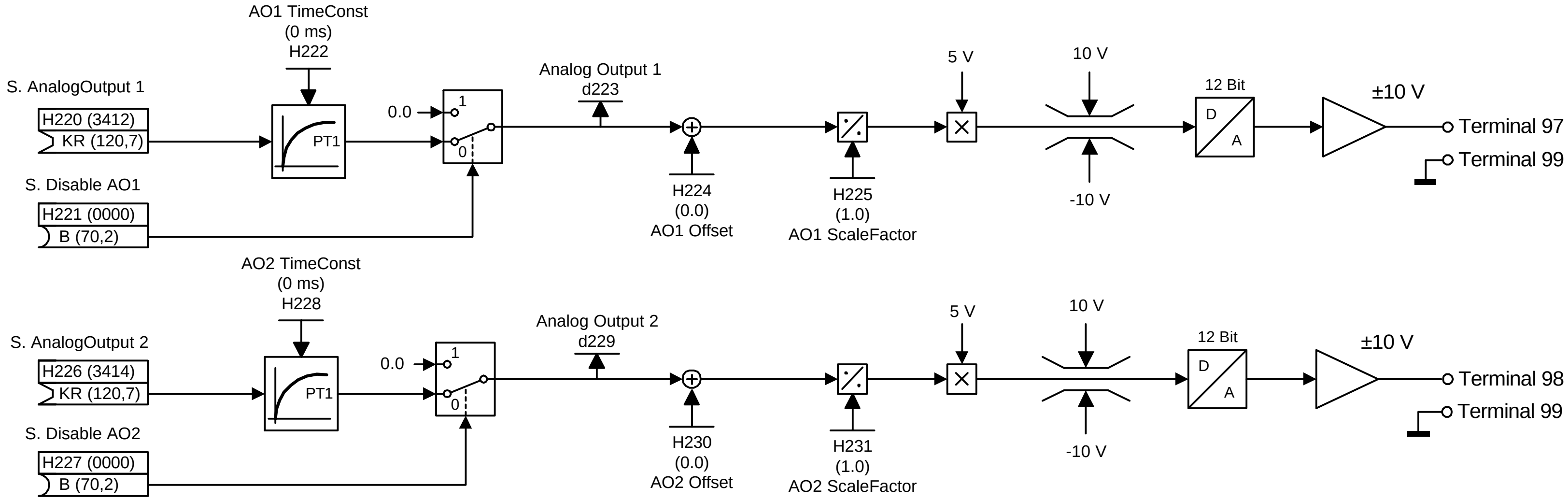

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Constant | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 80 - |
| Pulse encoder normalizations | | | | | 10.01.01 | Sheet cutter / Cut to Length | |



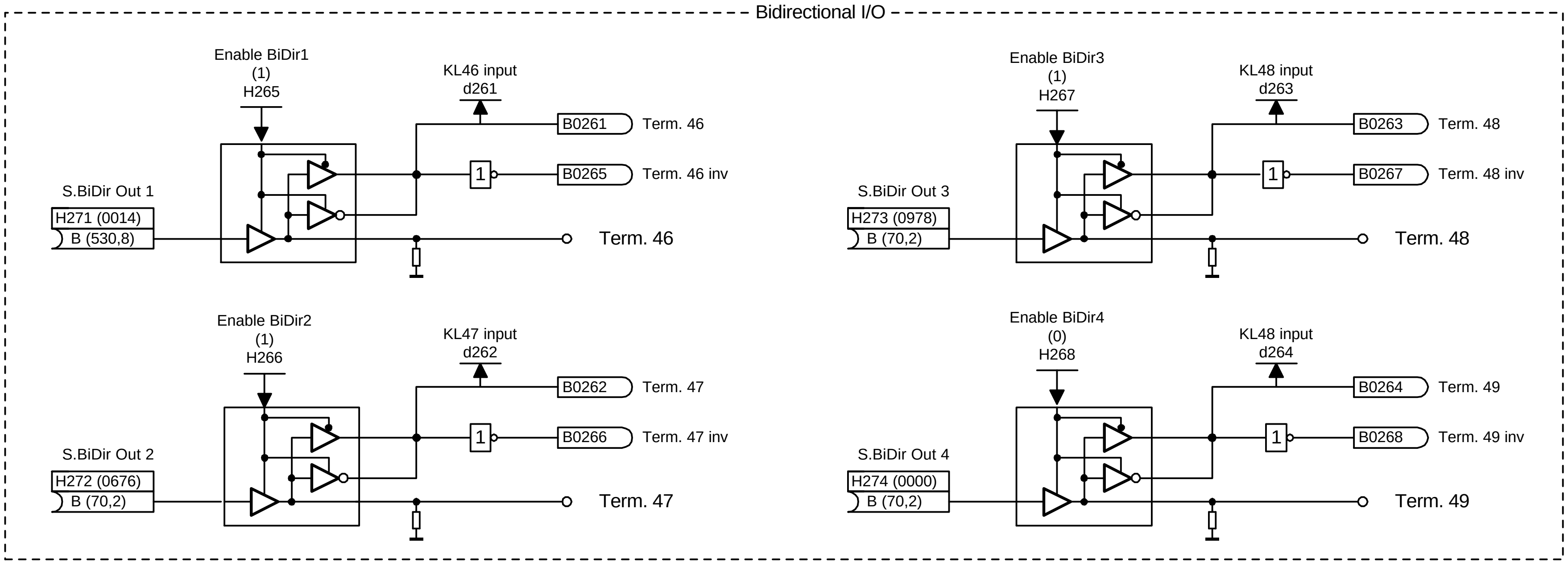

**Calculation cycle:**

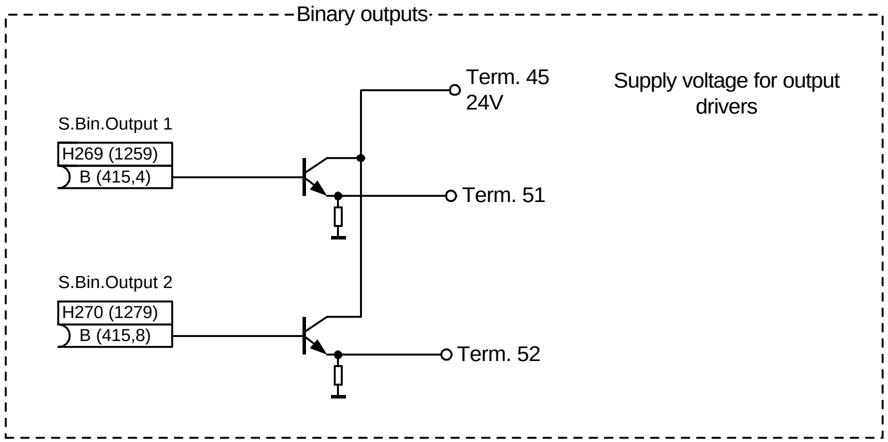
| **Input** | **Task** | **Cycle time** |
|---|---|---|
| AI1 | T3 | 12,8 ms |
| AI2 | T3 | 12,8 ms |
| AI3 | T4 | 51,2 ms |
| AI4 | T4 | 51,2 ms |
| AI5 | T4 | 51,2 ms |

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|


AO1 TimeConst
(0 ms)
H222
S. AnalogOutput 1
H220 (3412)
KR (120,7)
PT1
0.0
1
0
Analog Output 1
d223
S. Disable AO1
H221 (0000)
B (70,2)
H224
(0.0)
AO1 Offset
H225
(1.0)
AO1 ScaleFactor
5 V
10 V
-10 V
12 Bit
D
A
±10 V
Terminal 97
Terminal 99
AO2 TimeConst
(0 ms)
H228
S. AnalogOutput 2
H226 (3414)
KR (120,7)
PT1
0.0
1
0
Analog Output 2
d229
S. Disable AO2
H227 (0000)
B (70,2)
H230
(0.0)
AO2 Offset
H231
(1.0)
AO2 ScaleFactor
5 V
10 V
-10 V
12 Bit
D
A
±10 V
Terminal 98
Terminal 99

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|

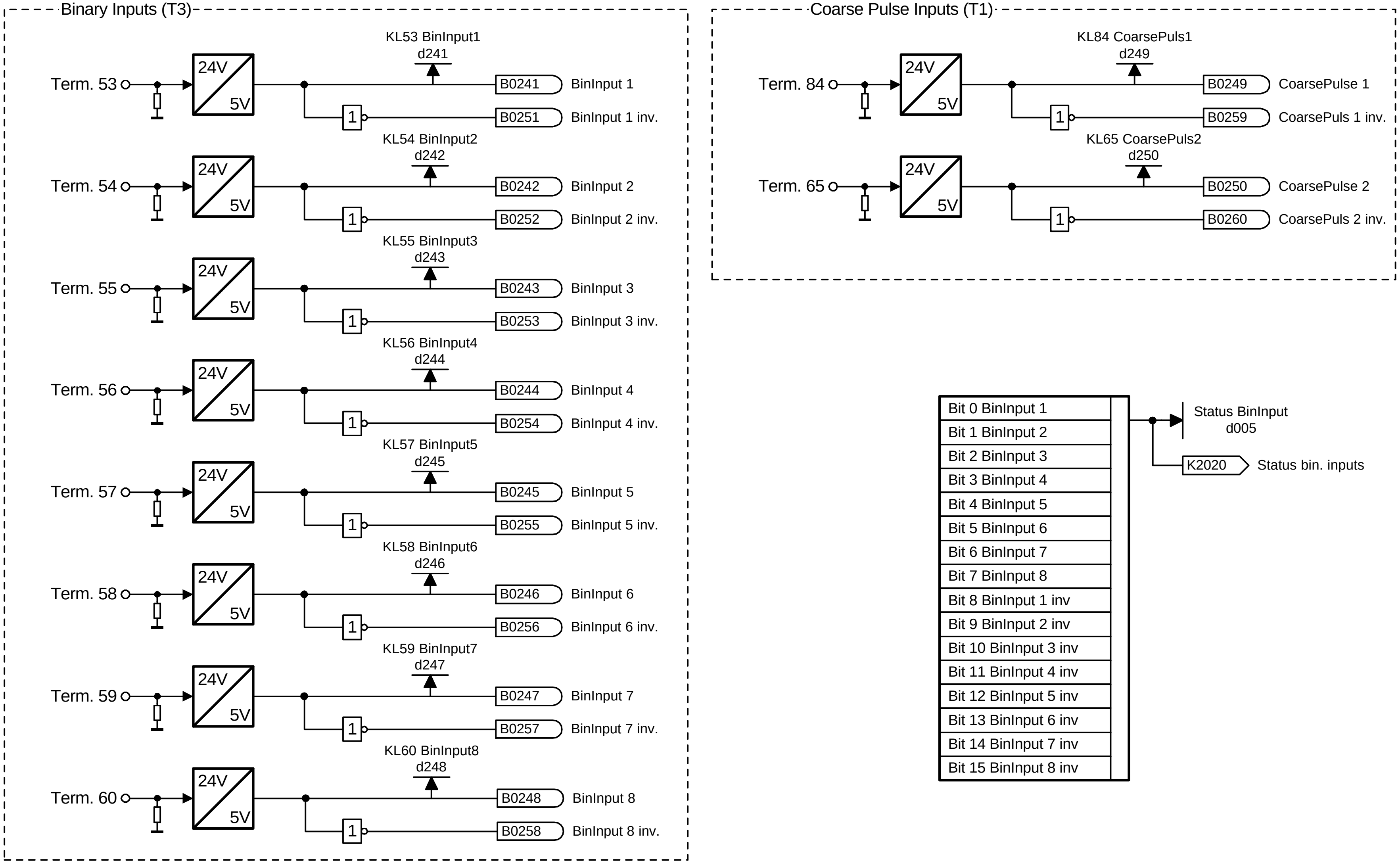


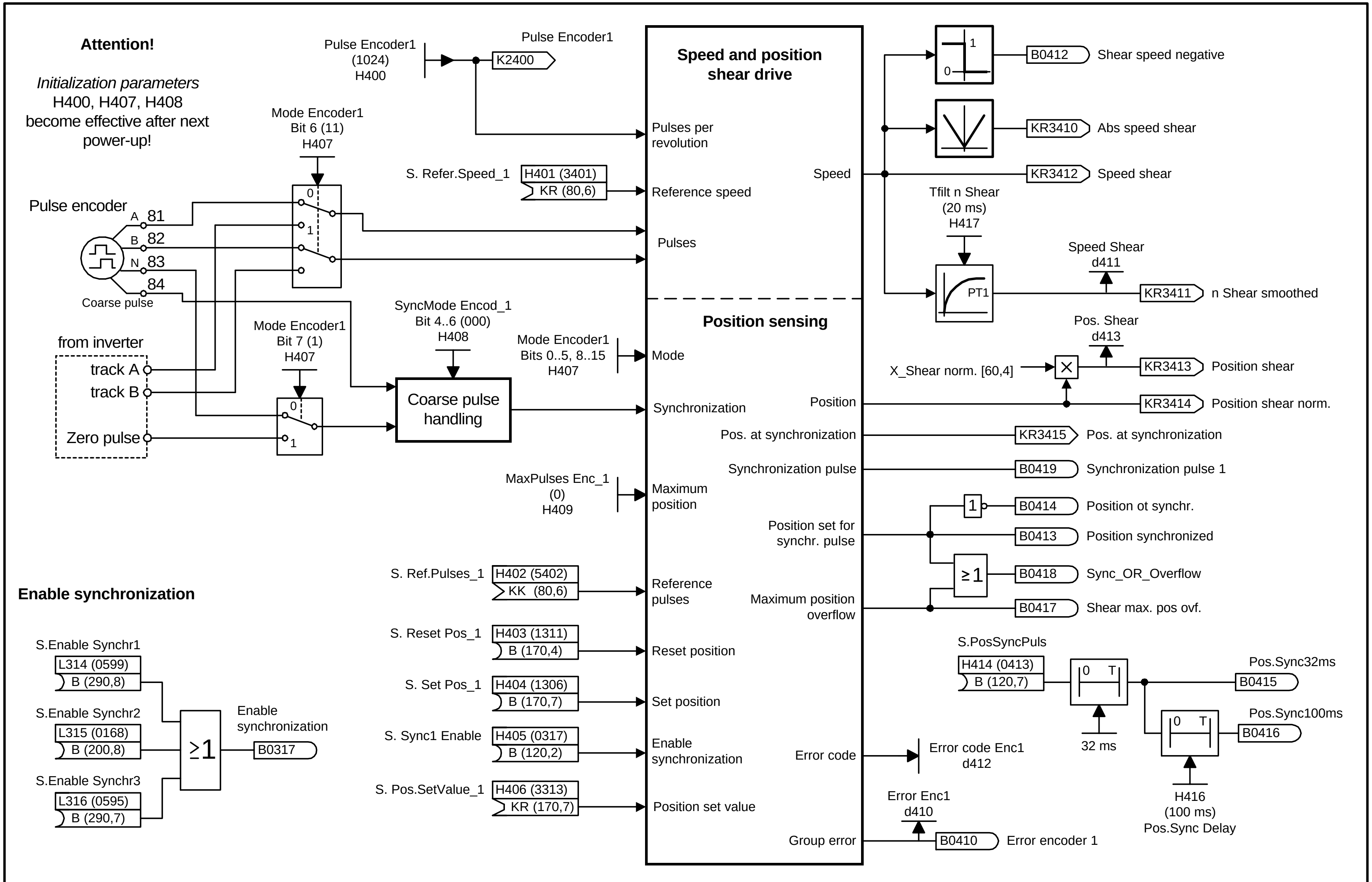

**Warning!**

H265 .. H268 are initialization parameters. Modification takes place after the next power on.

If bidirectional outputs are enabled as output the corresponding input value is inverted!
E.g.: H269 =1 ⇒ d264 displays a level inverse to terminal 49.

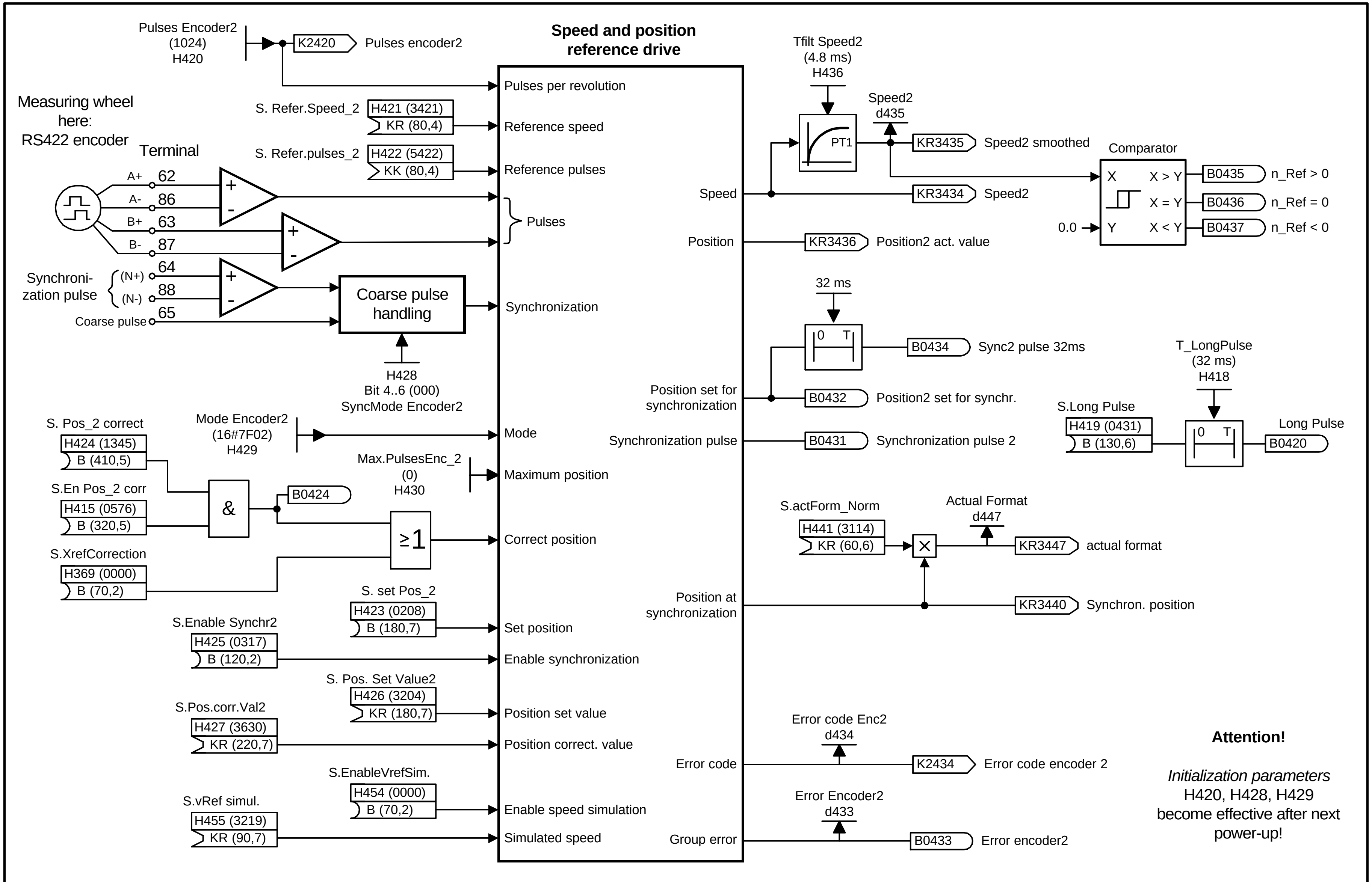



| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| T400 | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 110 - |
| Binary inputs | | | | | 10.01.01 | Sheet cutter / Cut to Length | |



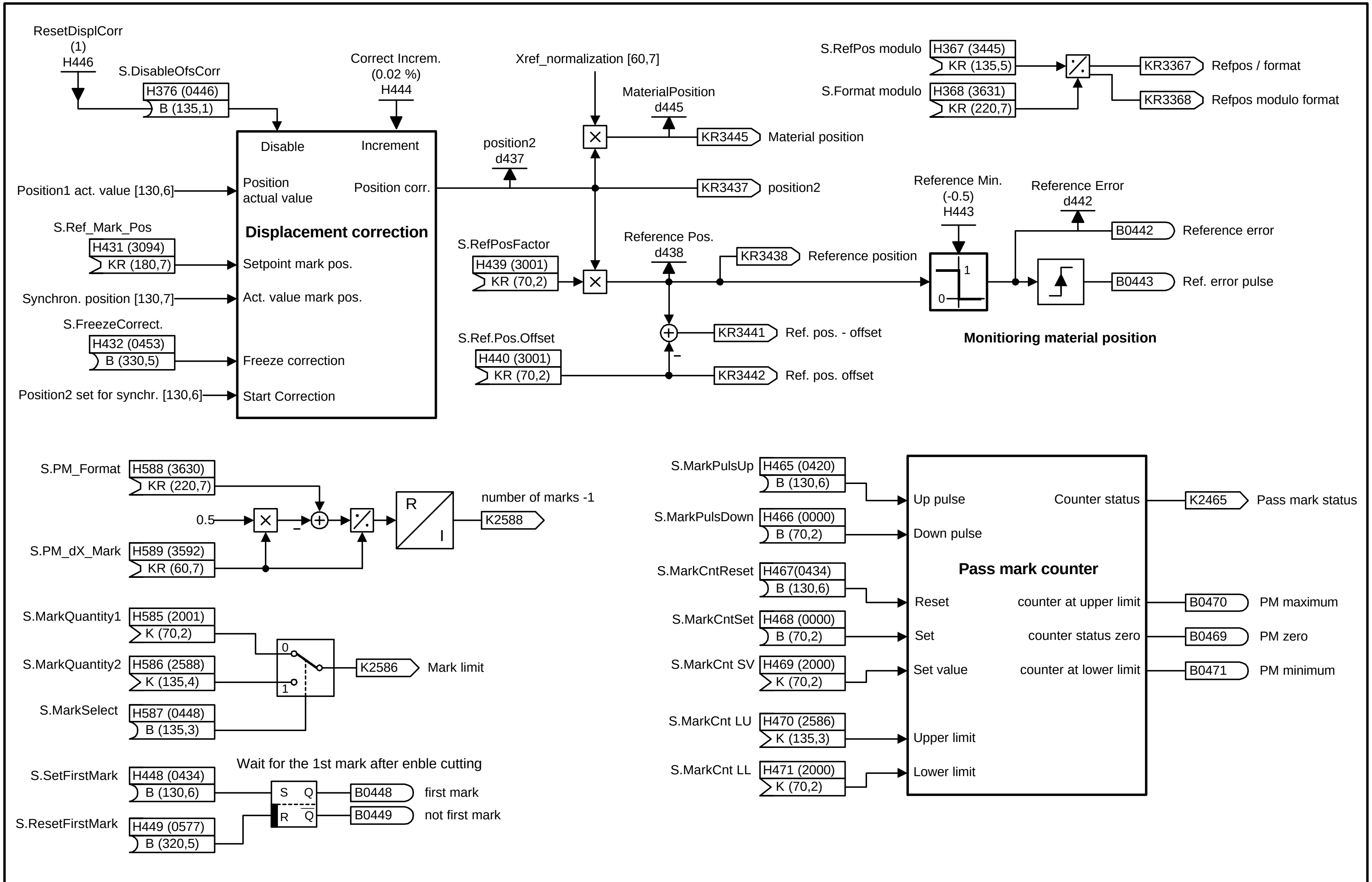

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| Position sensing | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 120 - |
| Shear drive | | 10.01.01 | Sheet cutter / Cut to Length | |



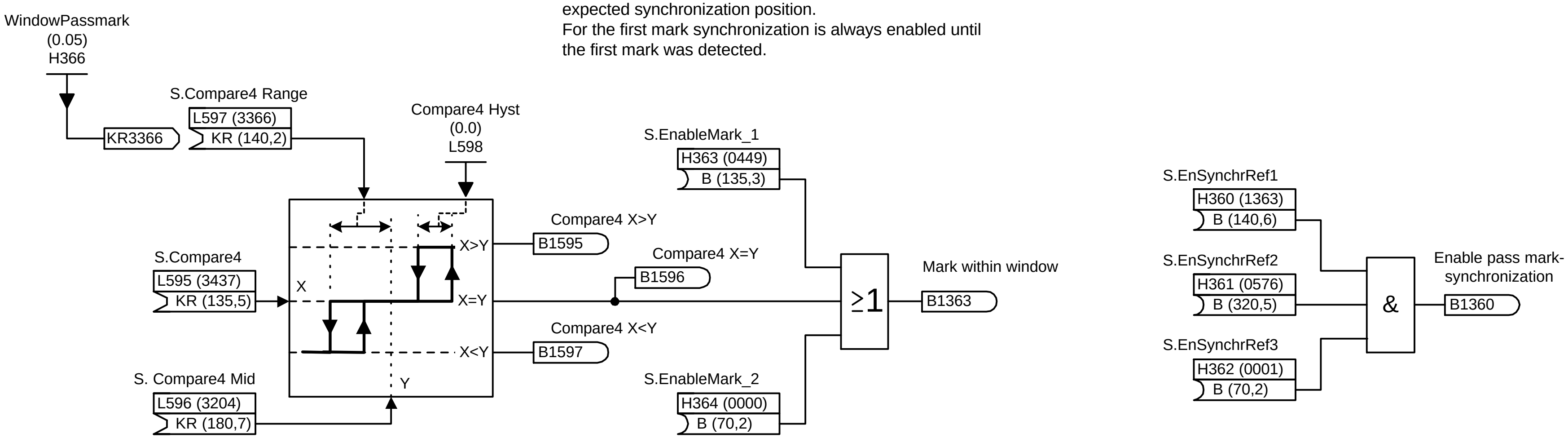

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| Position sensing | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 130 - |
| Reference position (material) | | 10.01.01 | Sheet cutter / Cut to Length | |

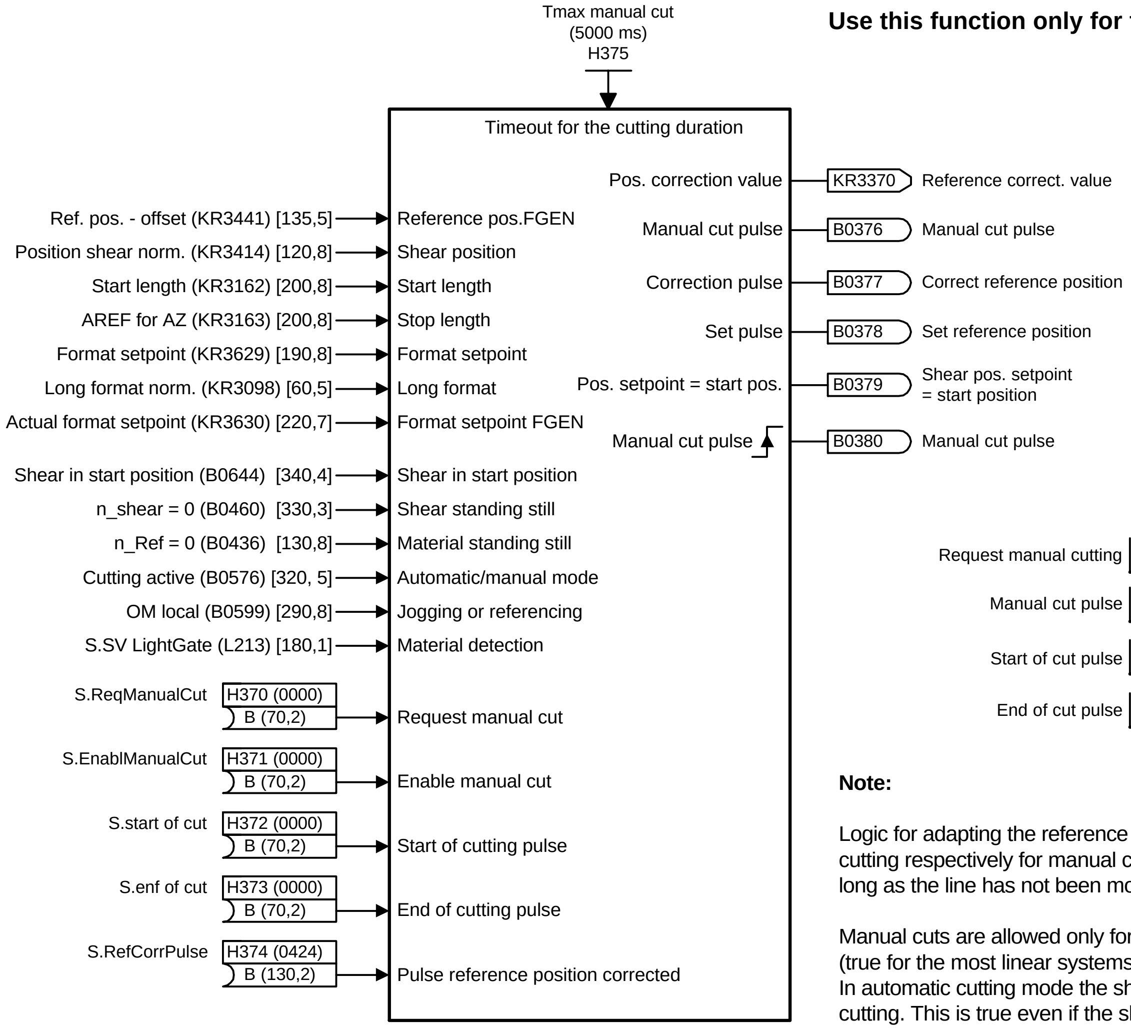



| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Position sensing | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 135 - |
| Displacement correction and pass mark counter | | | | | 10.01.01 | Sheet cutter / Cut to Length | |

Synchronization is enabled within a window close to the expected synchronization position.
For the first mark synchronization is always enabled until the first mark was detected.



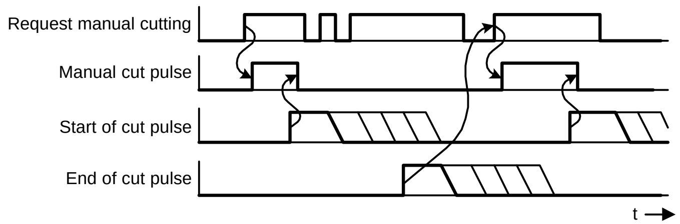
**Use this function only for test and only for systems with linear axis!**




Connect to:

| | |
|---|---|
| KR3370 | H427 [130,2] |
| B0376 | Cutting logic (application specific) |
| B0377 | H369 [130,1] |
| B0378 | L212 [180,1] |
| B0379 | H130 [210,1] and L535 [260,6] |

**Timing diagram for manual cutting**

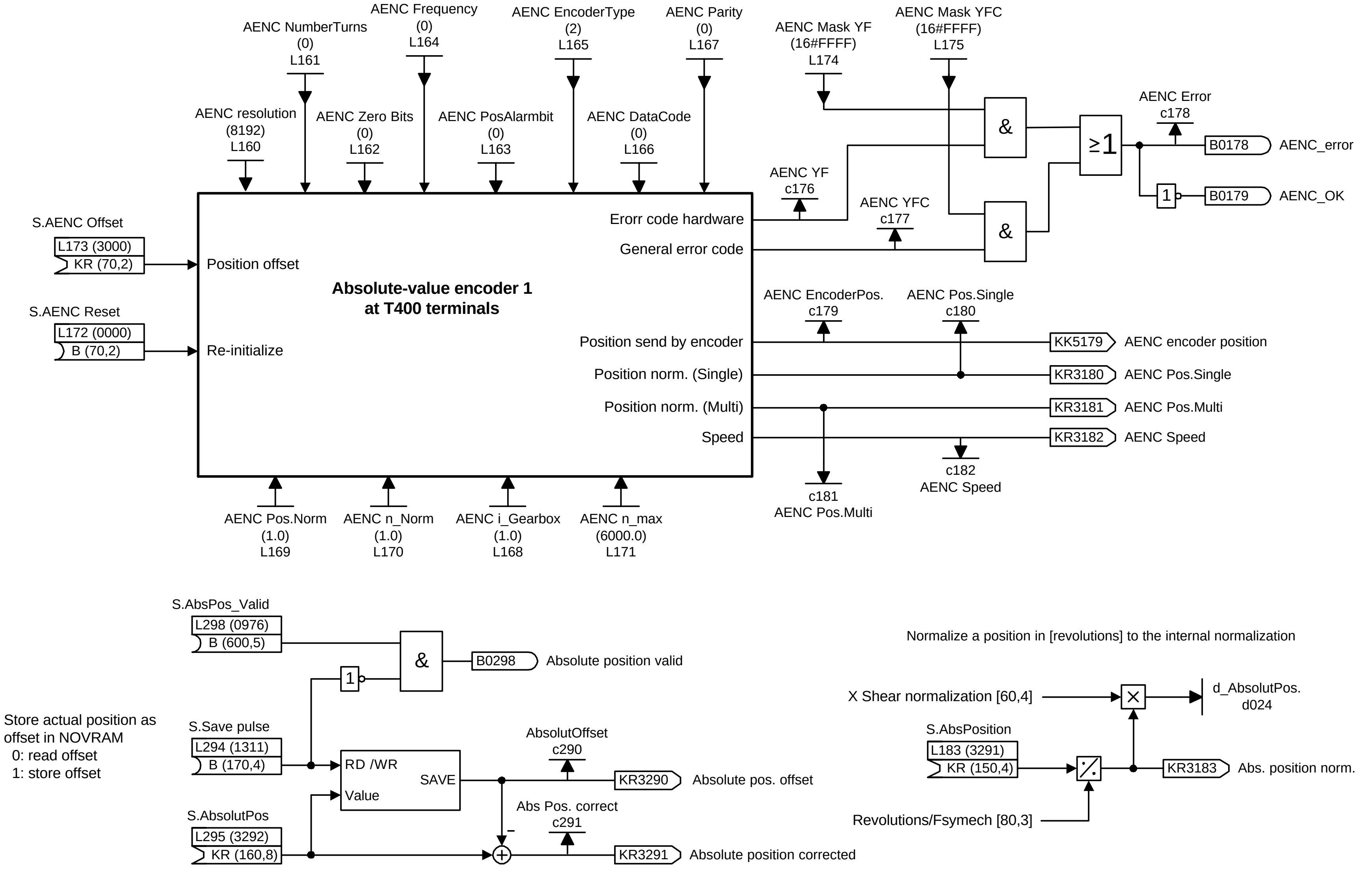



**Note:**

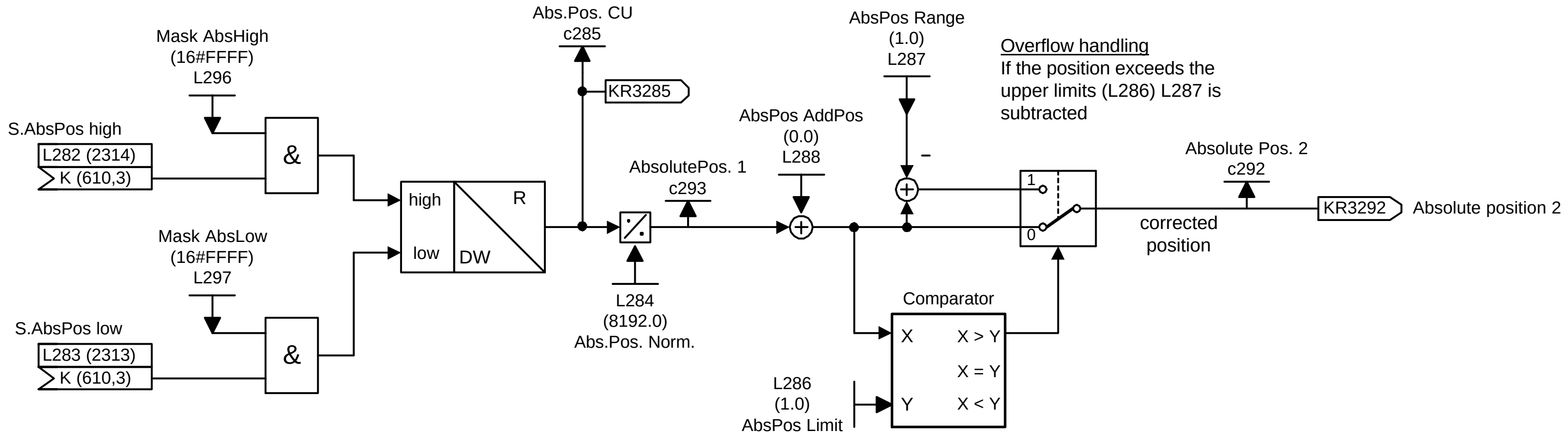
Logic for adapting the reference position after switching between local modes and continous cutting respectively for manual cutting.This logic enables to continue the automatic cutting as long as the line has not been moved too far (condition: material position < start length).

Manual cuts are allowed only for systems when cutting is possible even with standing line (true for the most linear systems).
In automatic cutting mode the shear has to be positioned to the start position after manual cutting. This is true even if the shear is allready in this position. The logic for starting the positioning has to be changed in this way.

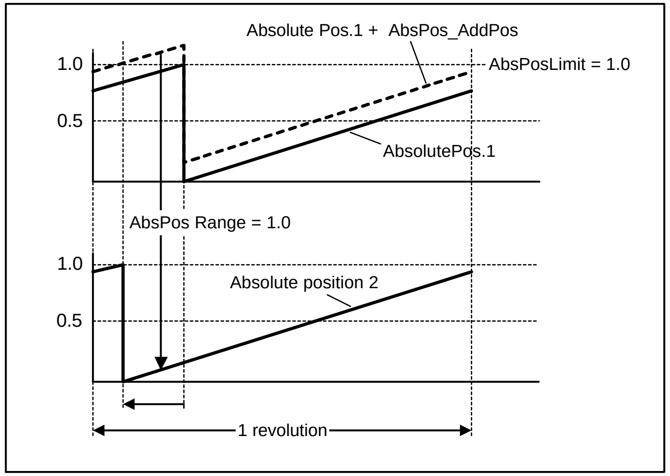
For rotary systems set H440 = 3000 [135, 4];




| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Position sensing | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 150 - |
| Absolute-value encoder on T400 and normalization | | | | | 10.01.01 | Sheet cutter / Cut to Length | |

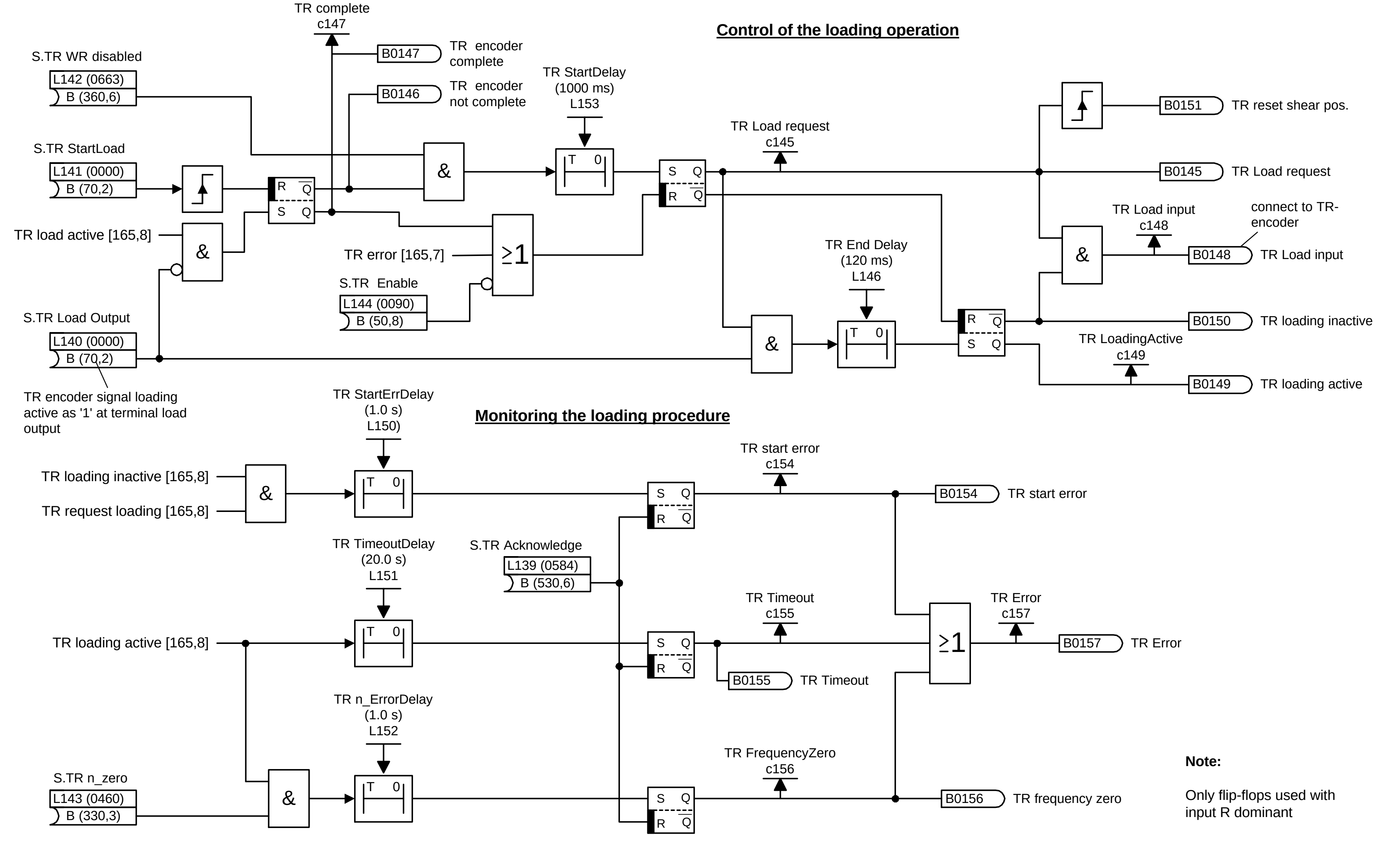



Excample for shifting the position value of a single turn absolute-value encoder




| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|

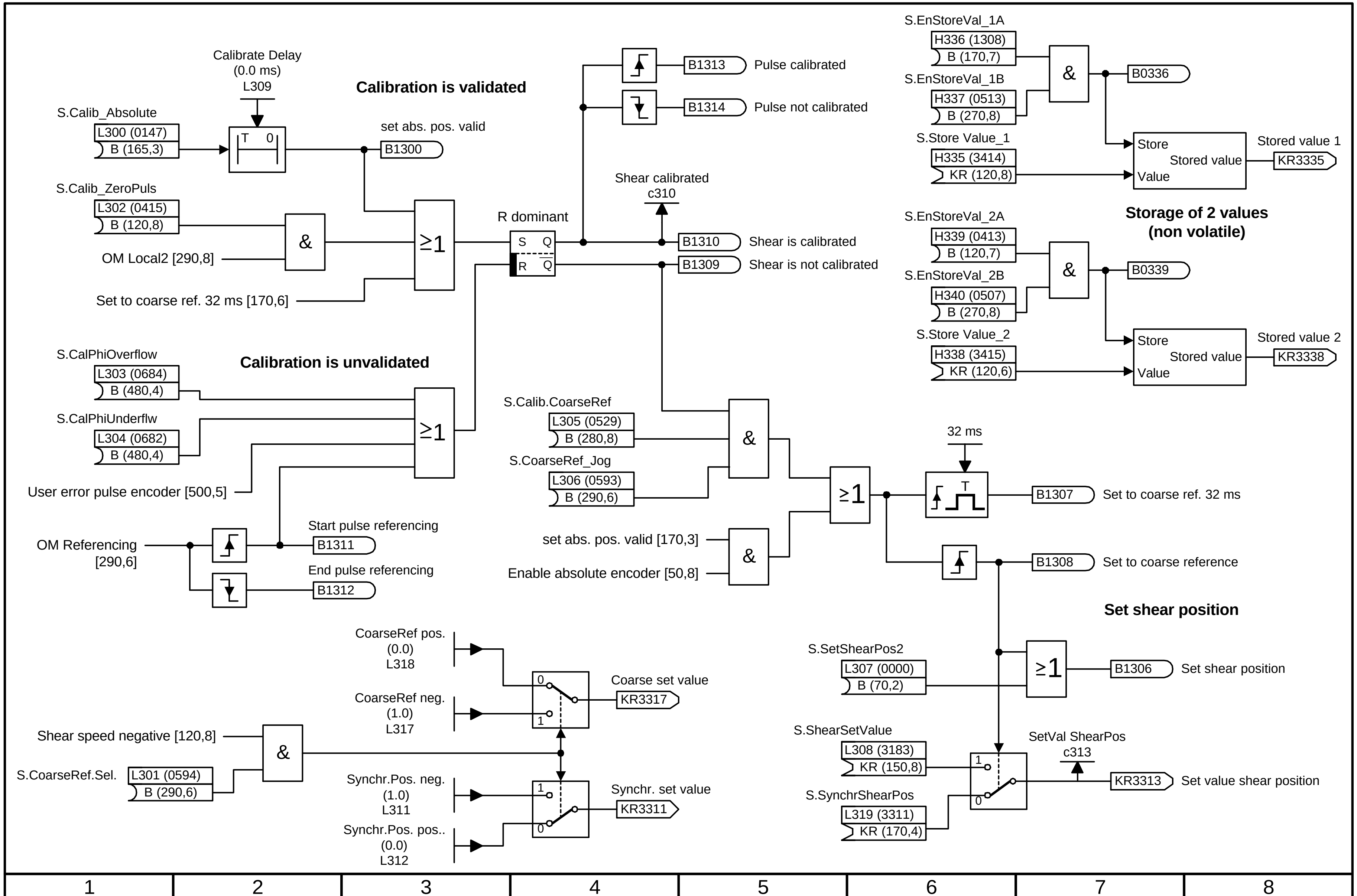
| | | | | |
|---|---|---|---|---|
| Speed and Position | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 160 - |
| Absolute-value encoder (CU) | | 10.01.01 | Sheet cutter / Cut to Length | |




| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|

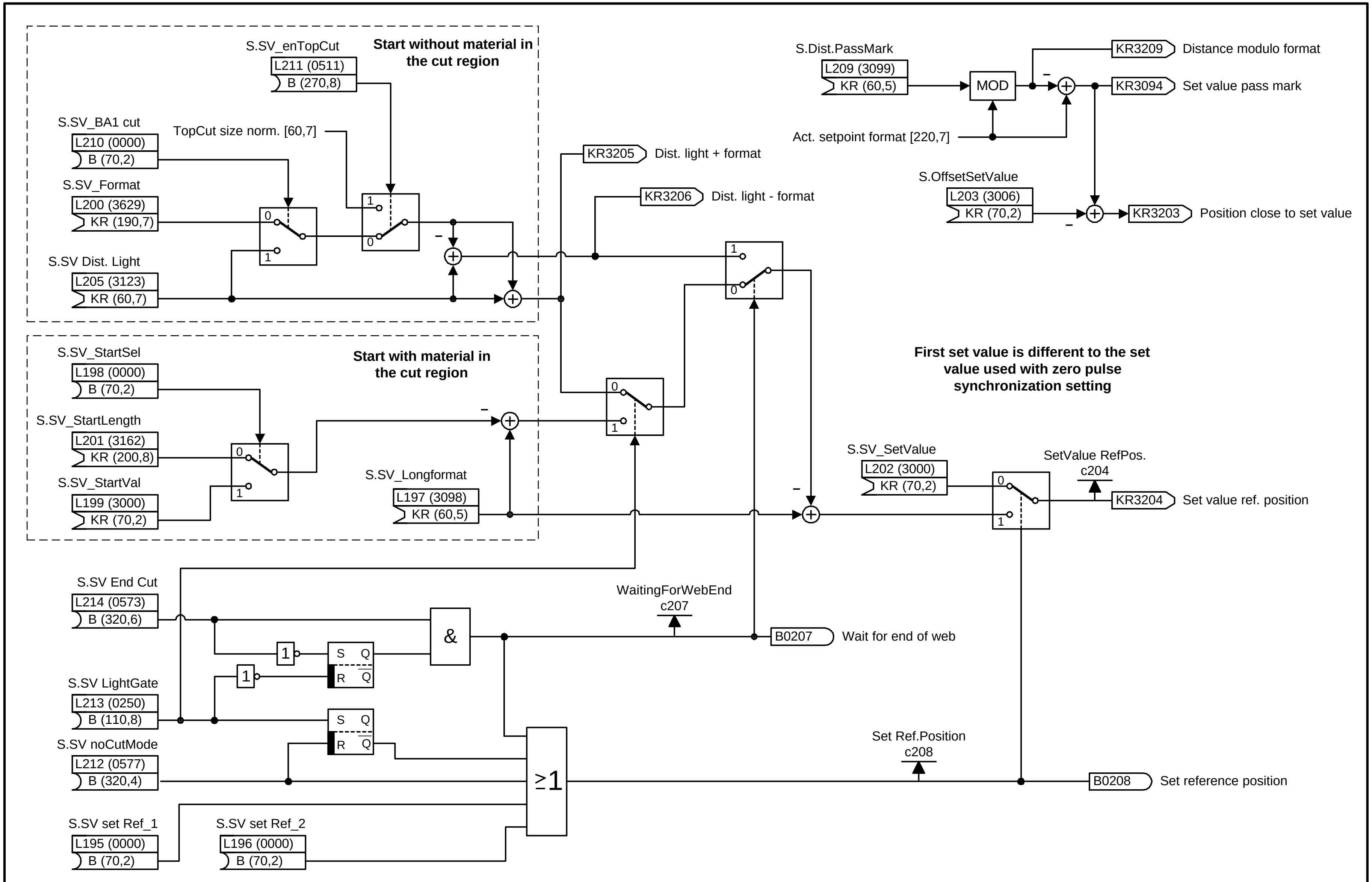
Position sensing | V1.02 | FPlan_SPS450e.vsd | Function diagram

TR encoder | 10.01.01 | Sheet cutter / Cut to Length



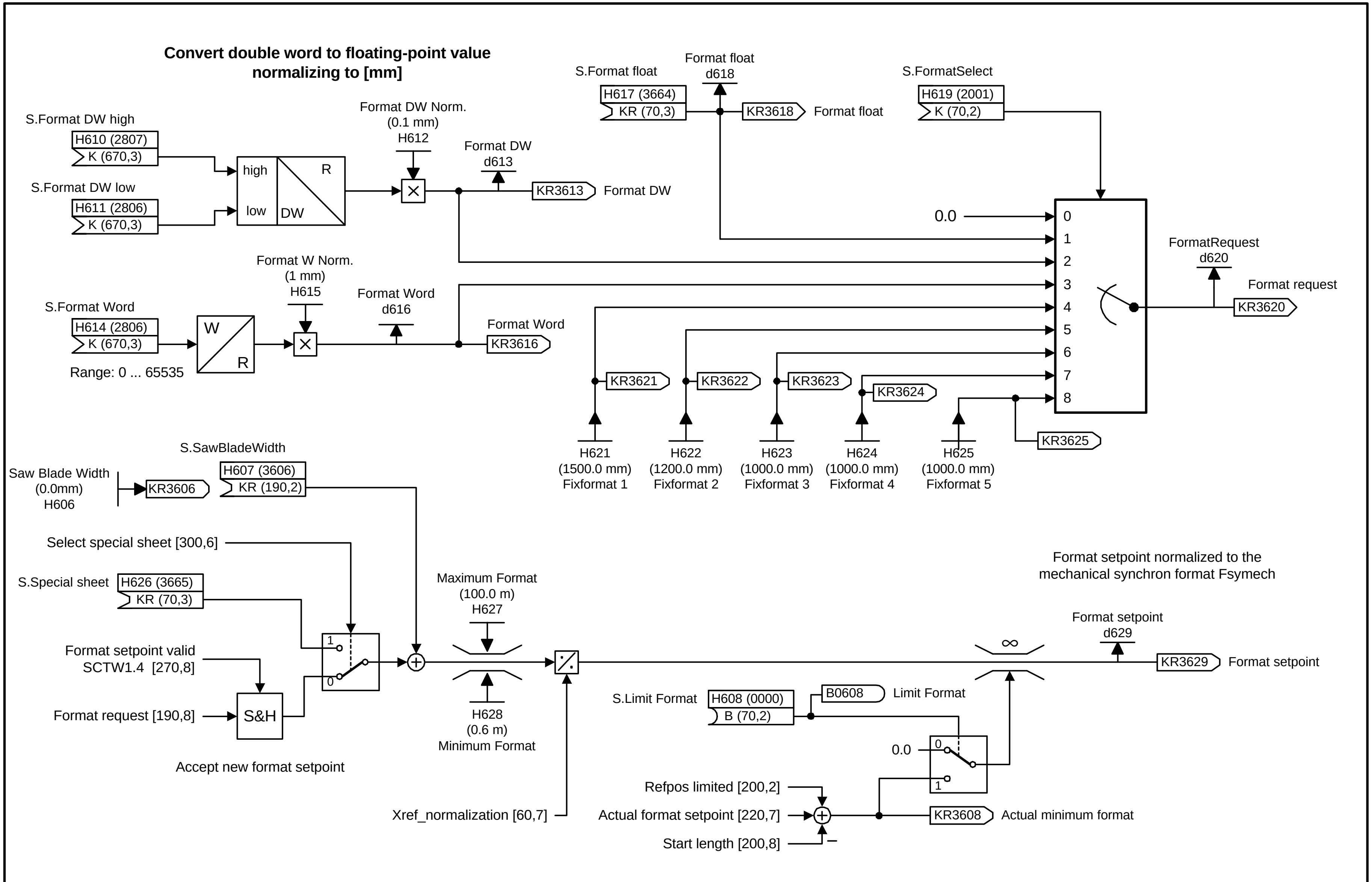

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| Position sensing | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 170 - |
| Calibrate shear | | 10.01.01 | Sheet cutter / Cut to Length | |

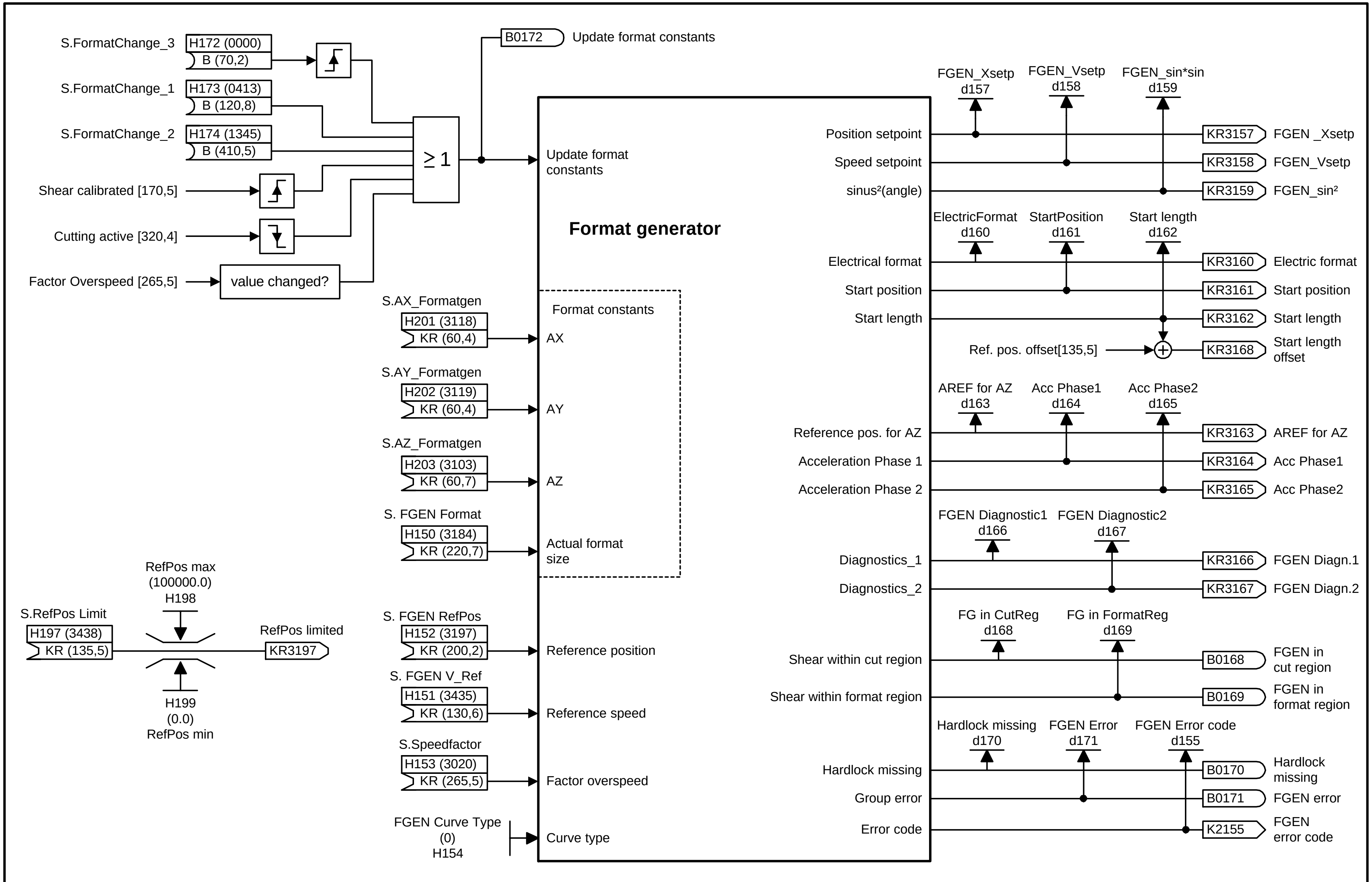



| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|

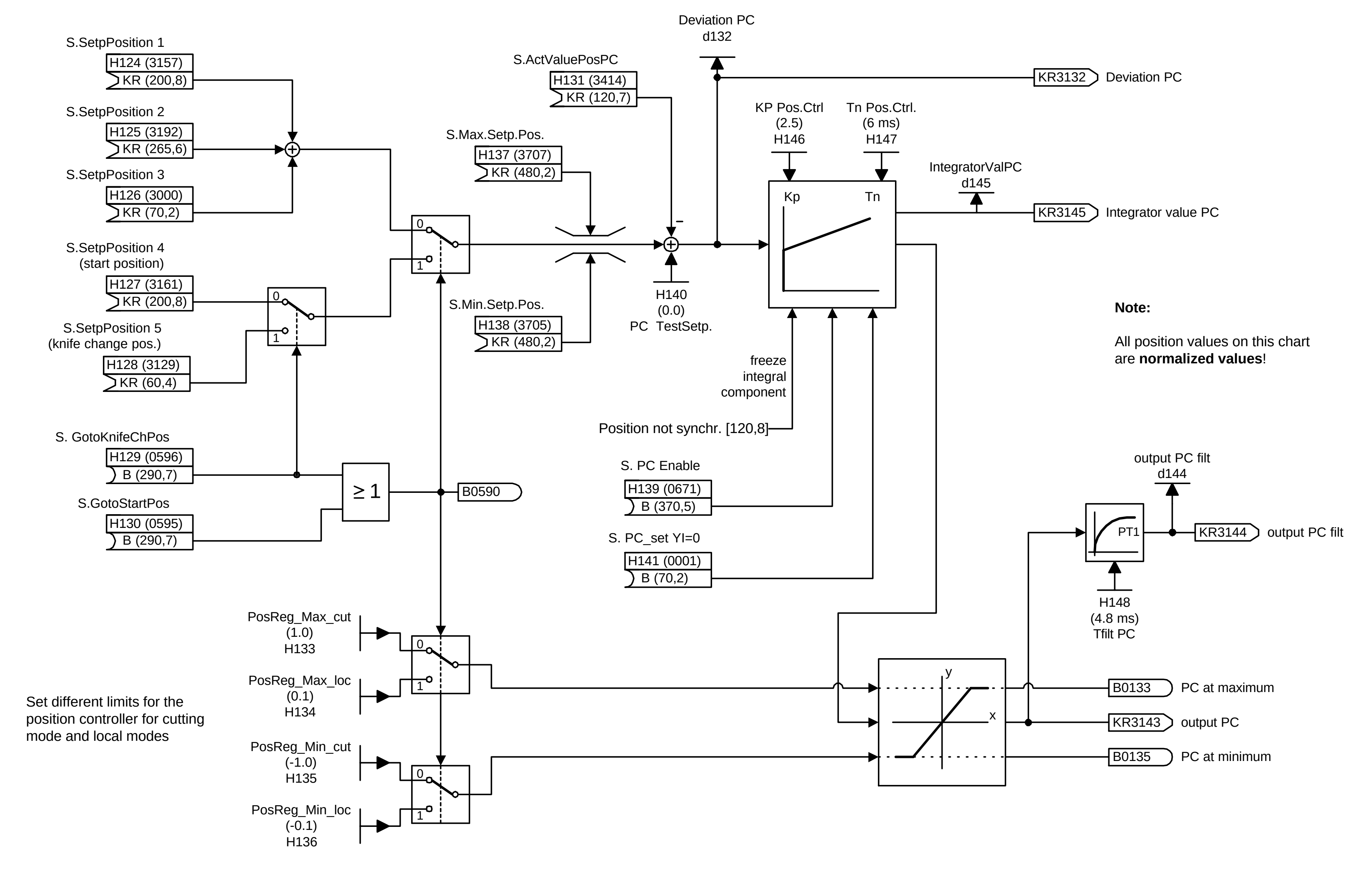
| | | | | |
|---|---|---|---|---|
| Position sensing | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 180 - |
| Set reference position | | 10.01.01 | Sheet cutter / Cut to Length | |




| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Shear control | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 190 - |
| Format setpoint selection | | | | | 10.01.01 | Sheet cutter / Cut to Length | |

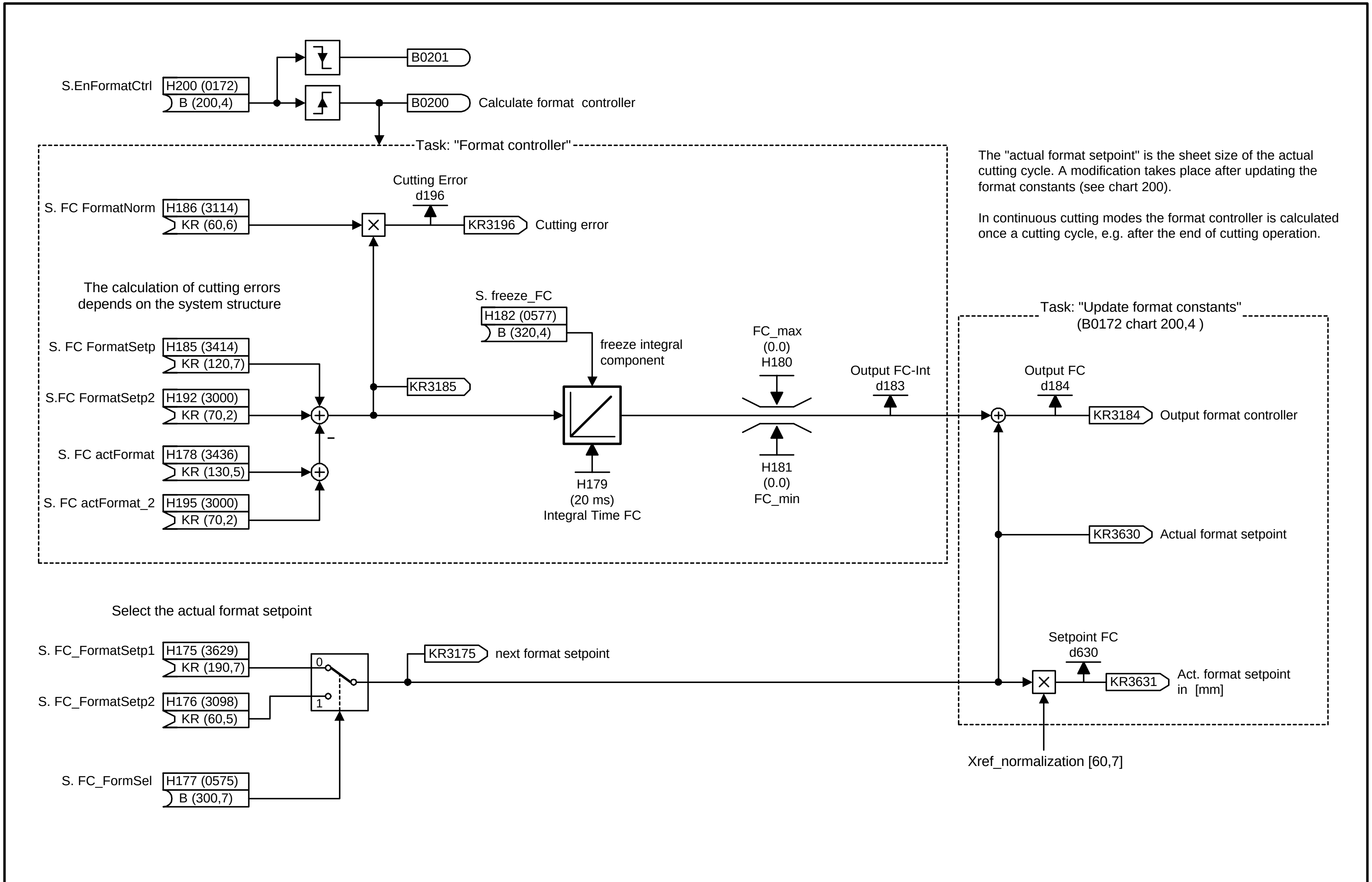



| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Shear control | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 200 - |
| Format generator (FGEN) | | | | | 10.01.01 | Sheet cutter / Cut to Length | |

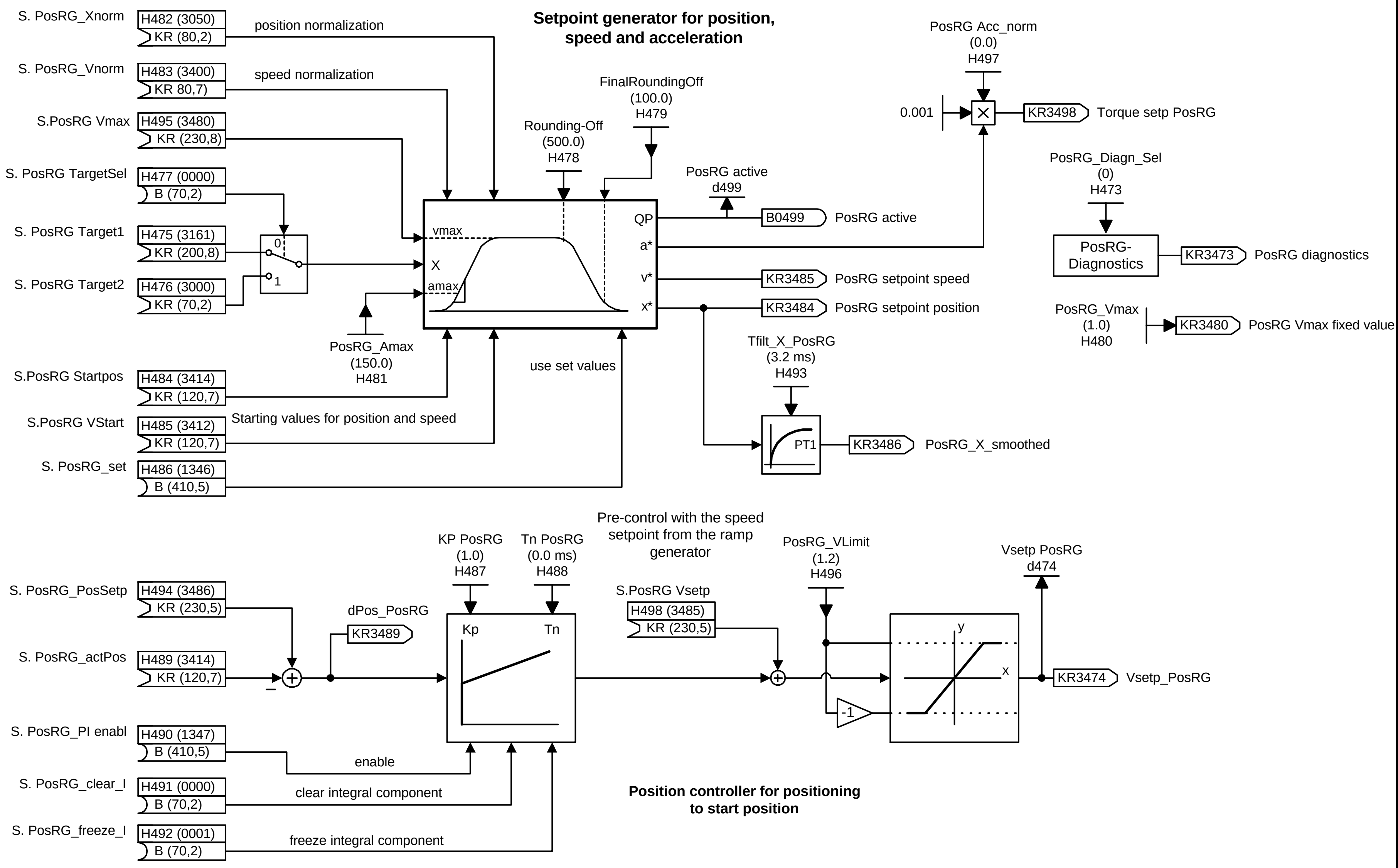



| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| Shear control | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 210 - |
| Position controller (PC) | | 10.01.01 | Sheet cutter / Cut to Length | |

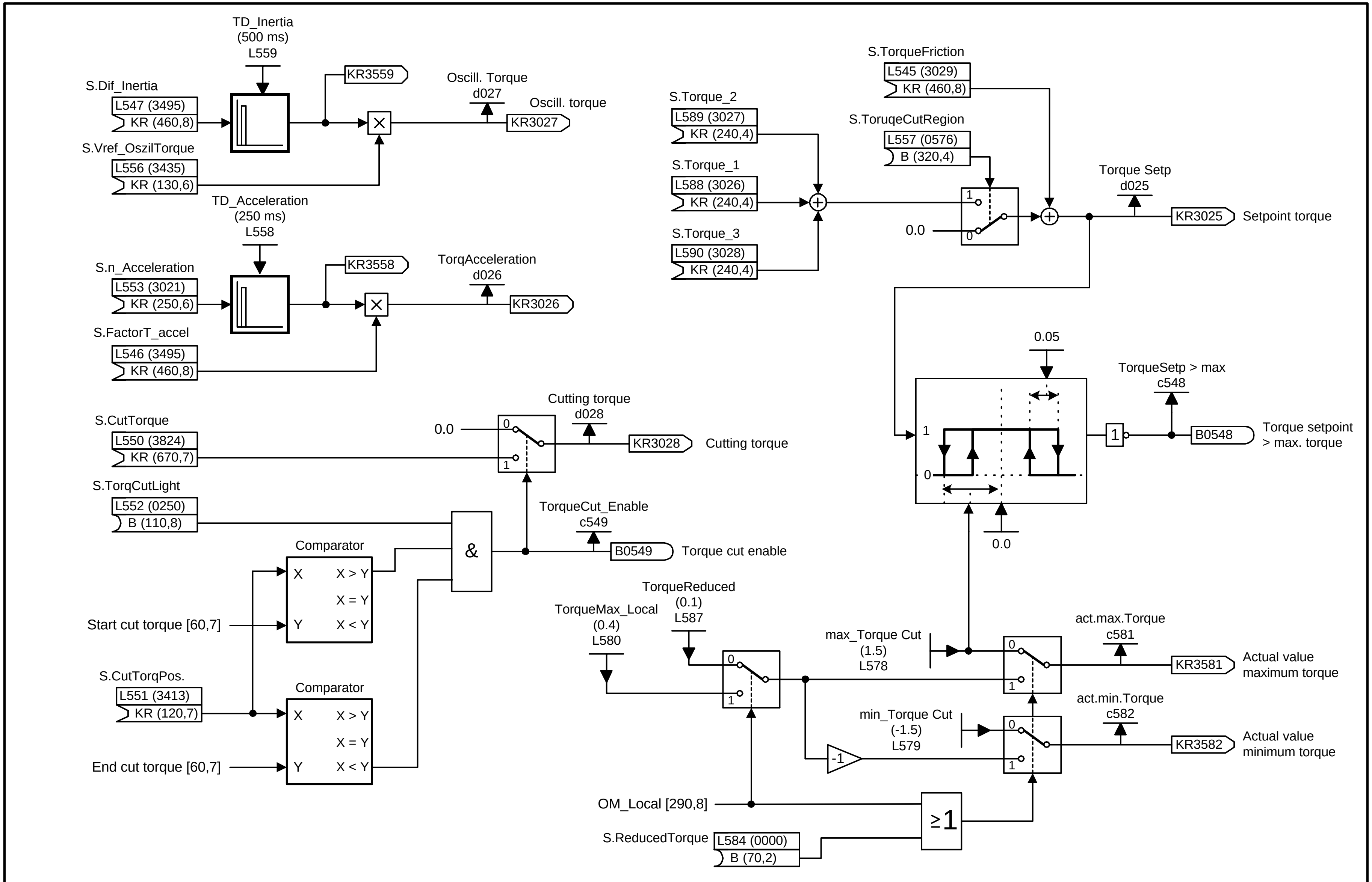



| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Shear control | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 220 - |
| Format controller | | | | | 10.01.01 | Sheet cutter / Cut to Length | |



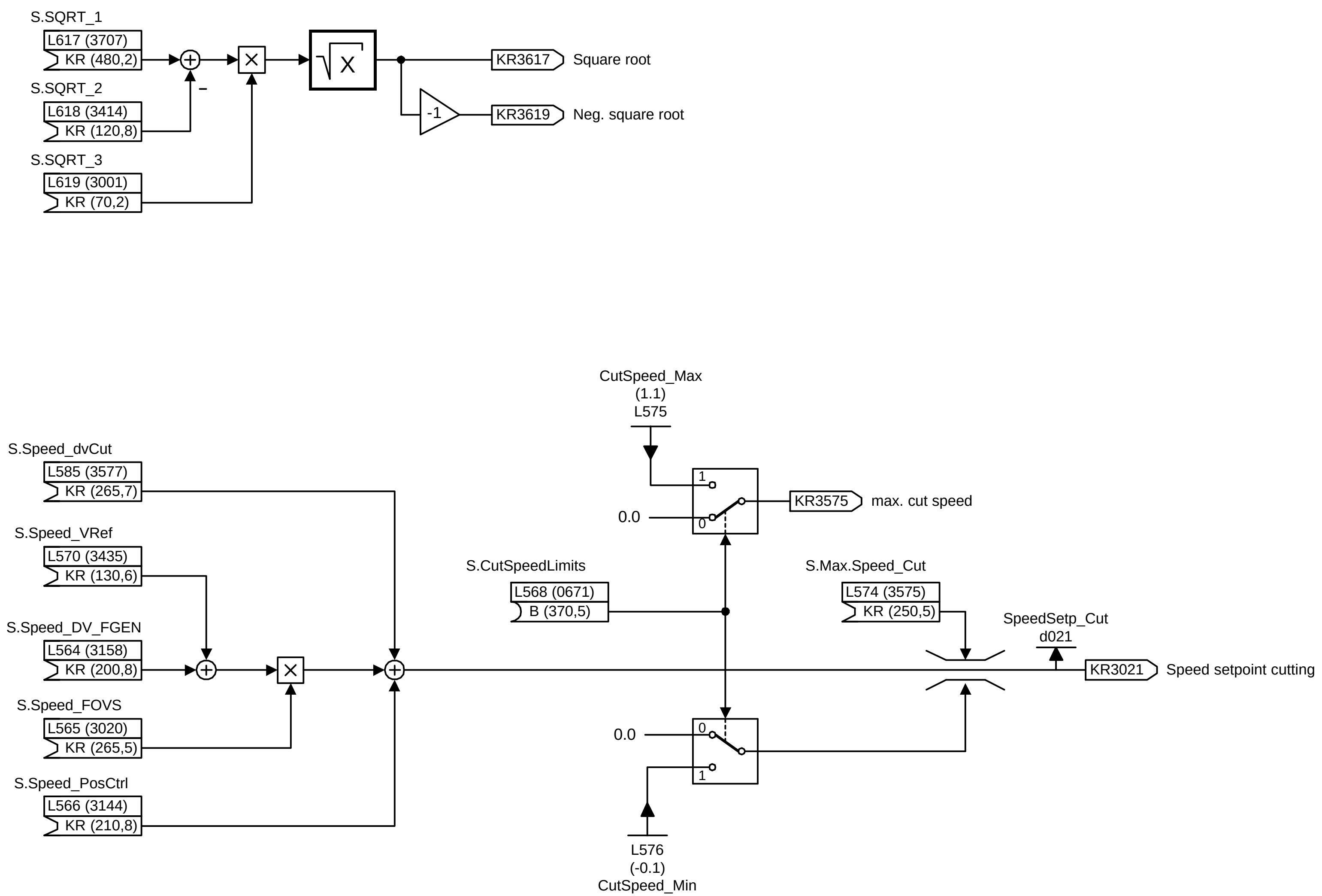

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| Shear control | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 230 - |
| Positioning with ramp generator PosRG | | 10.01.01 | Sheet cutter / Cut to Length | |

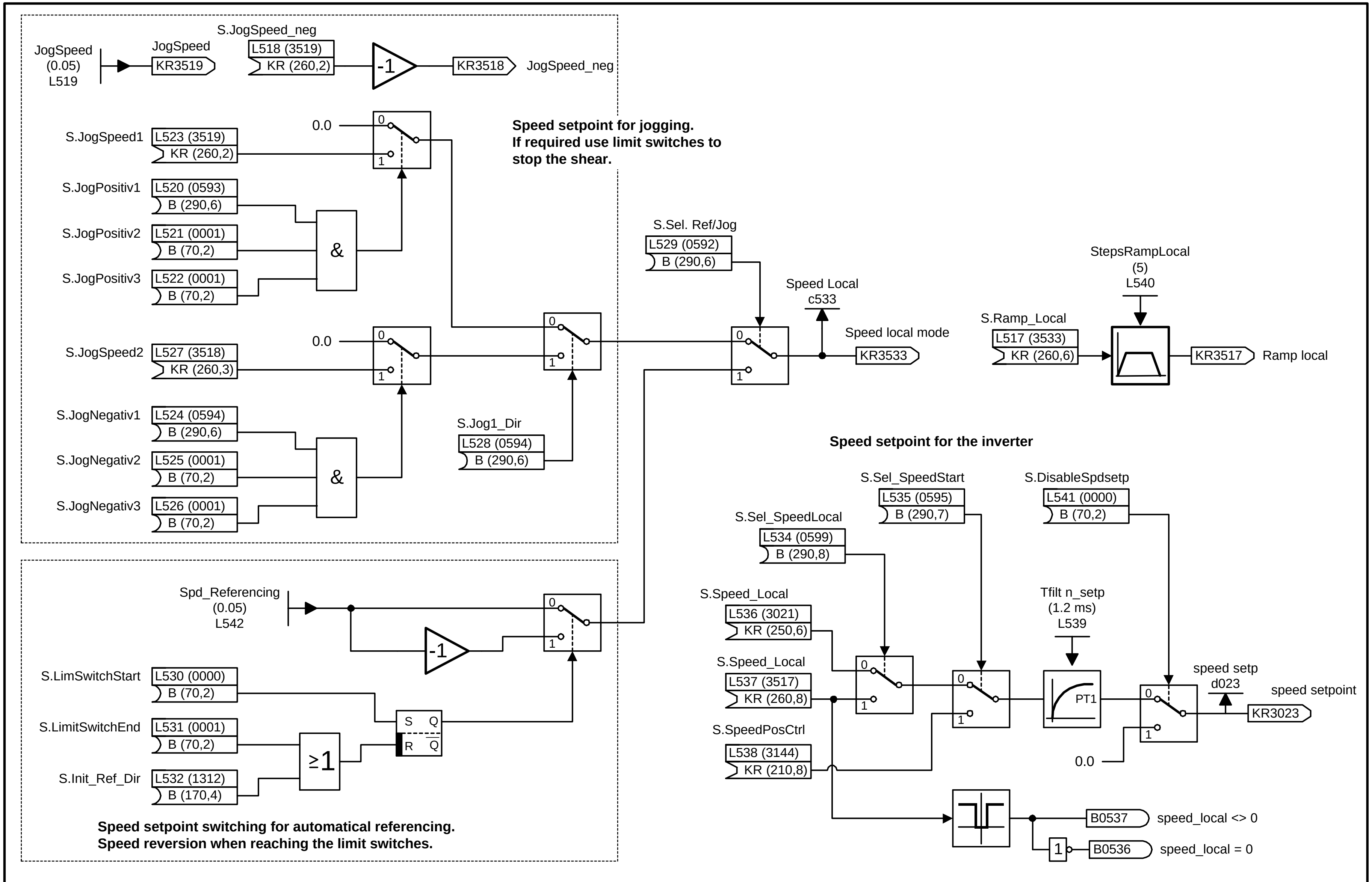



| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|

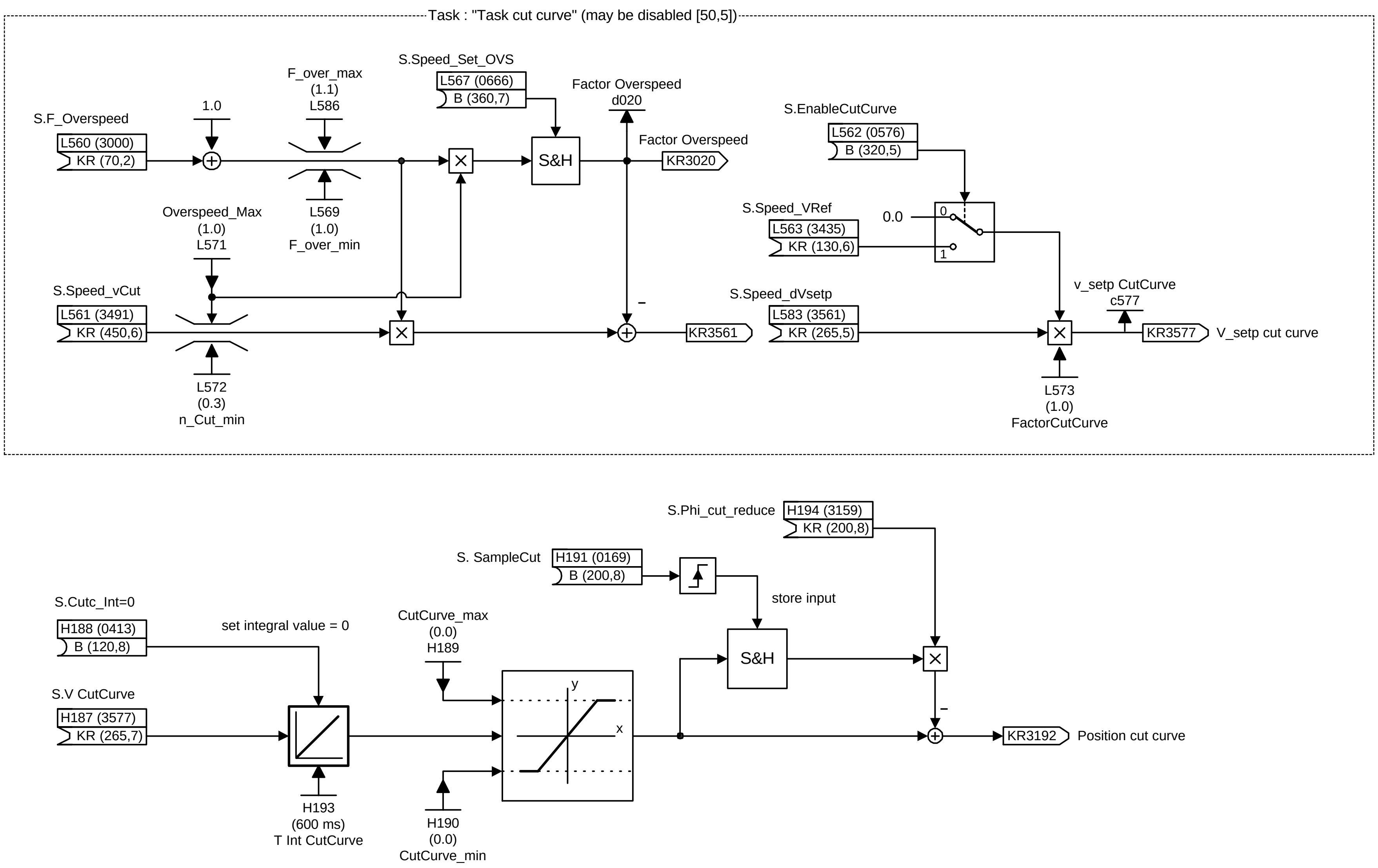
| | | | | |
|---|---|---|---|---|
| Shear control | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 240 - |
| Torque calculation | | 10.01.01 | Sheet cutter / Cut to Length | |



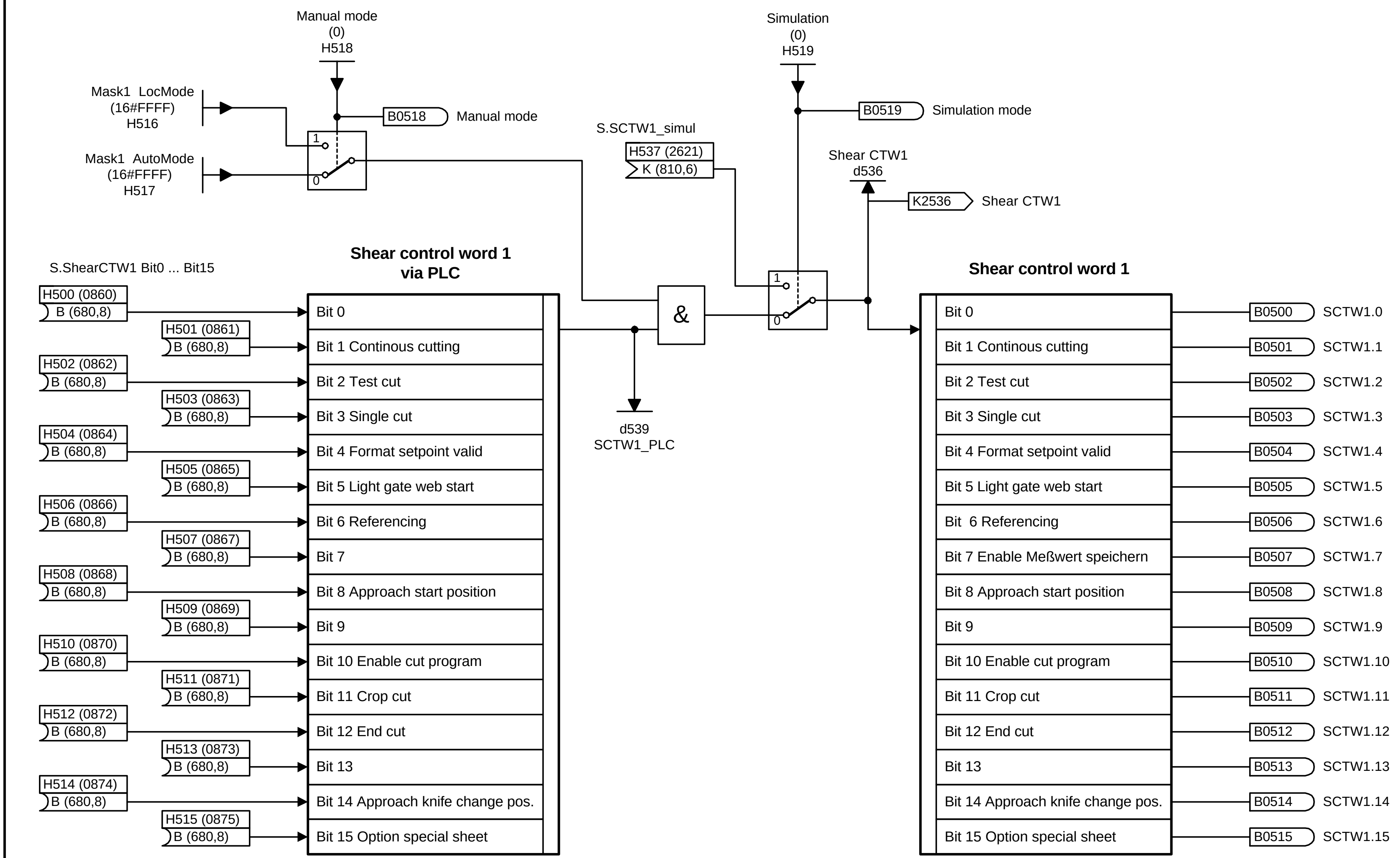

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Shear control | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 250 - |
| Cutting speed | | | | | 10.01.01 | Sheet cutter / Cut to Length | |



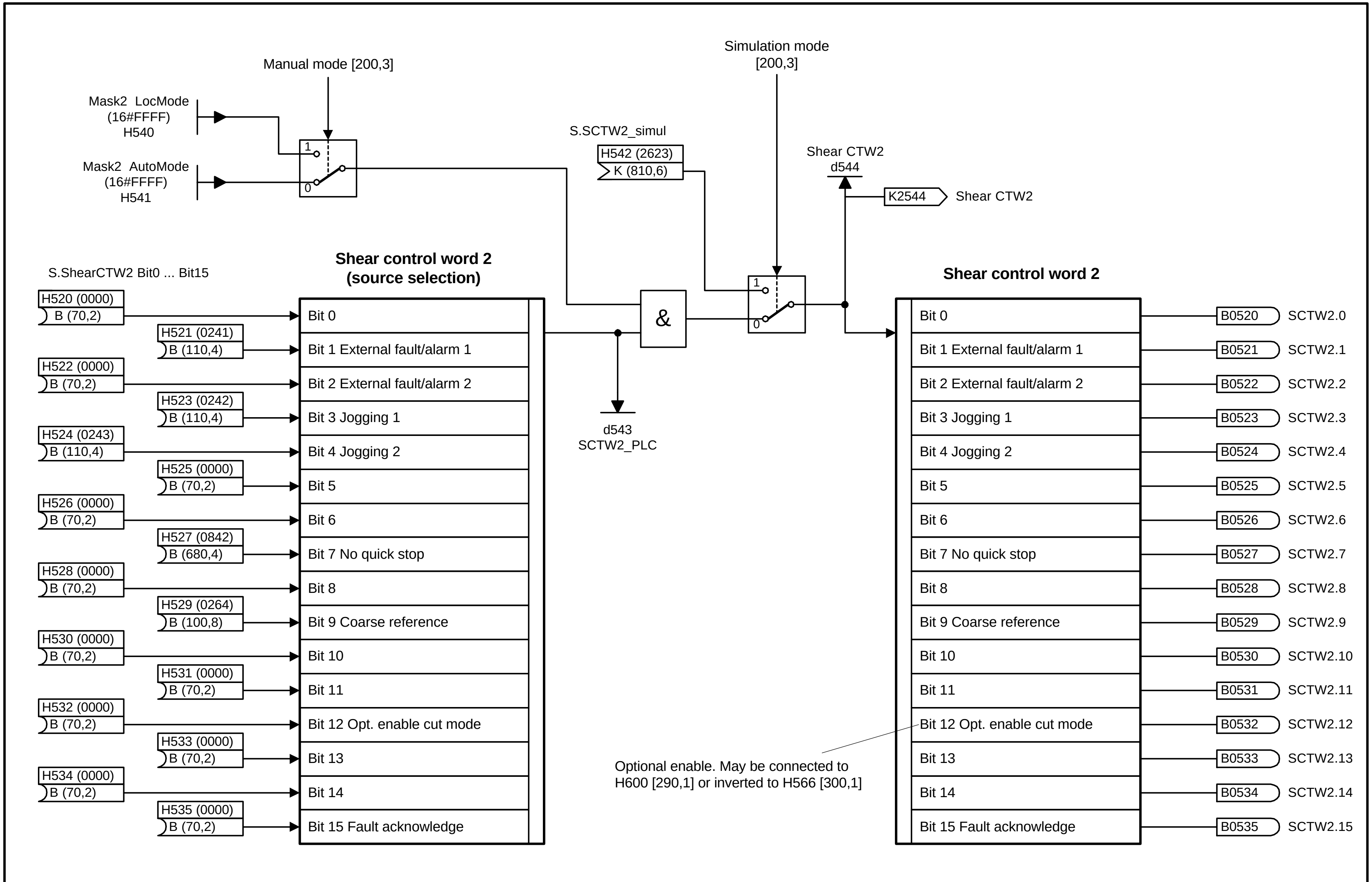

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Shear control | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 260 - |
| Speed local modes and setpoint for inverter | | | | | 10.01.01 | Sheet cutter / Cut to Length | |



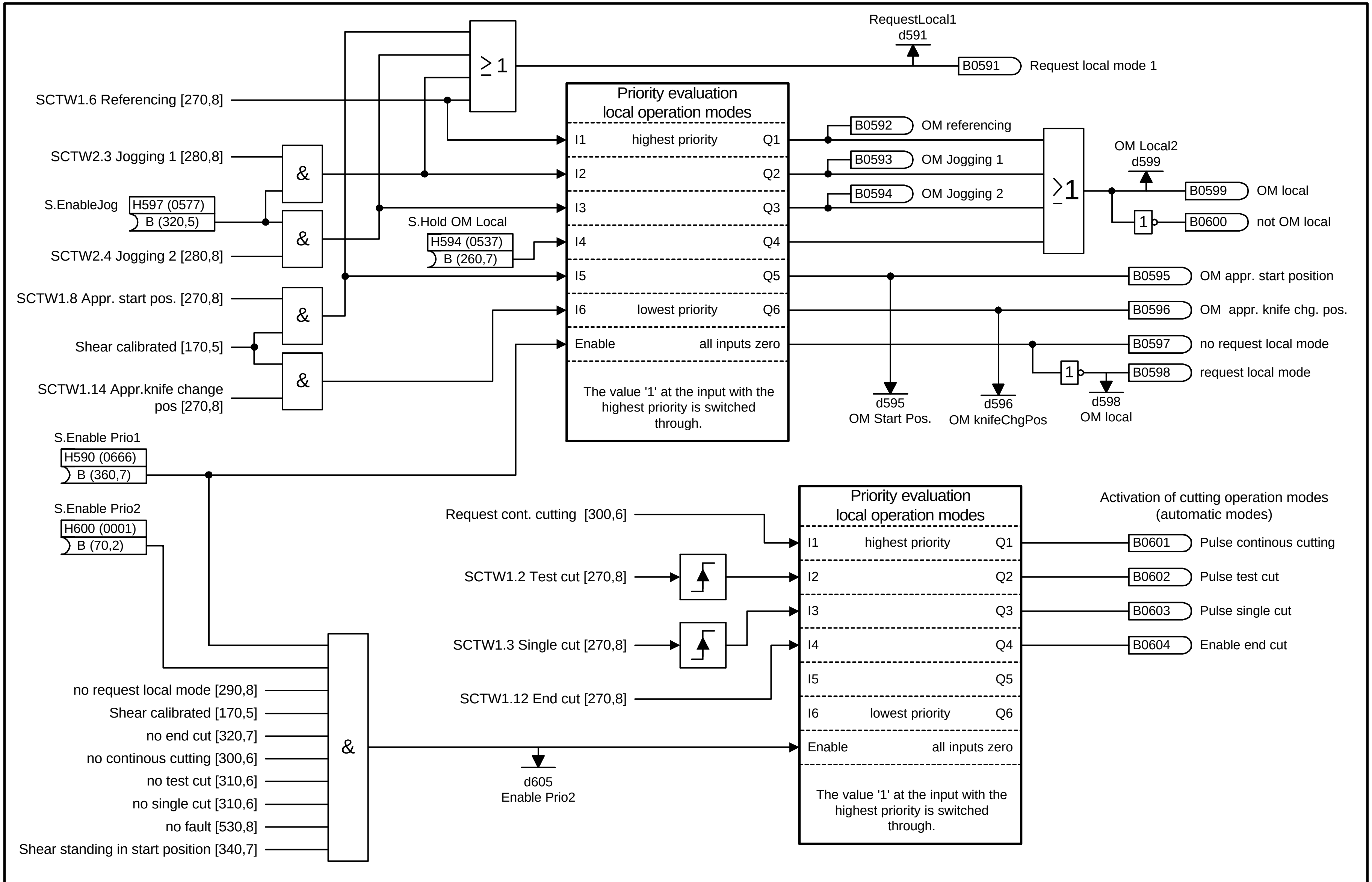

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Shear control | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 265 - |
| Cut curve and overspeed | | | | | 10.01.01 | Sheet cutter / Cut to Length | |



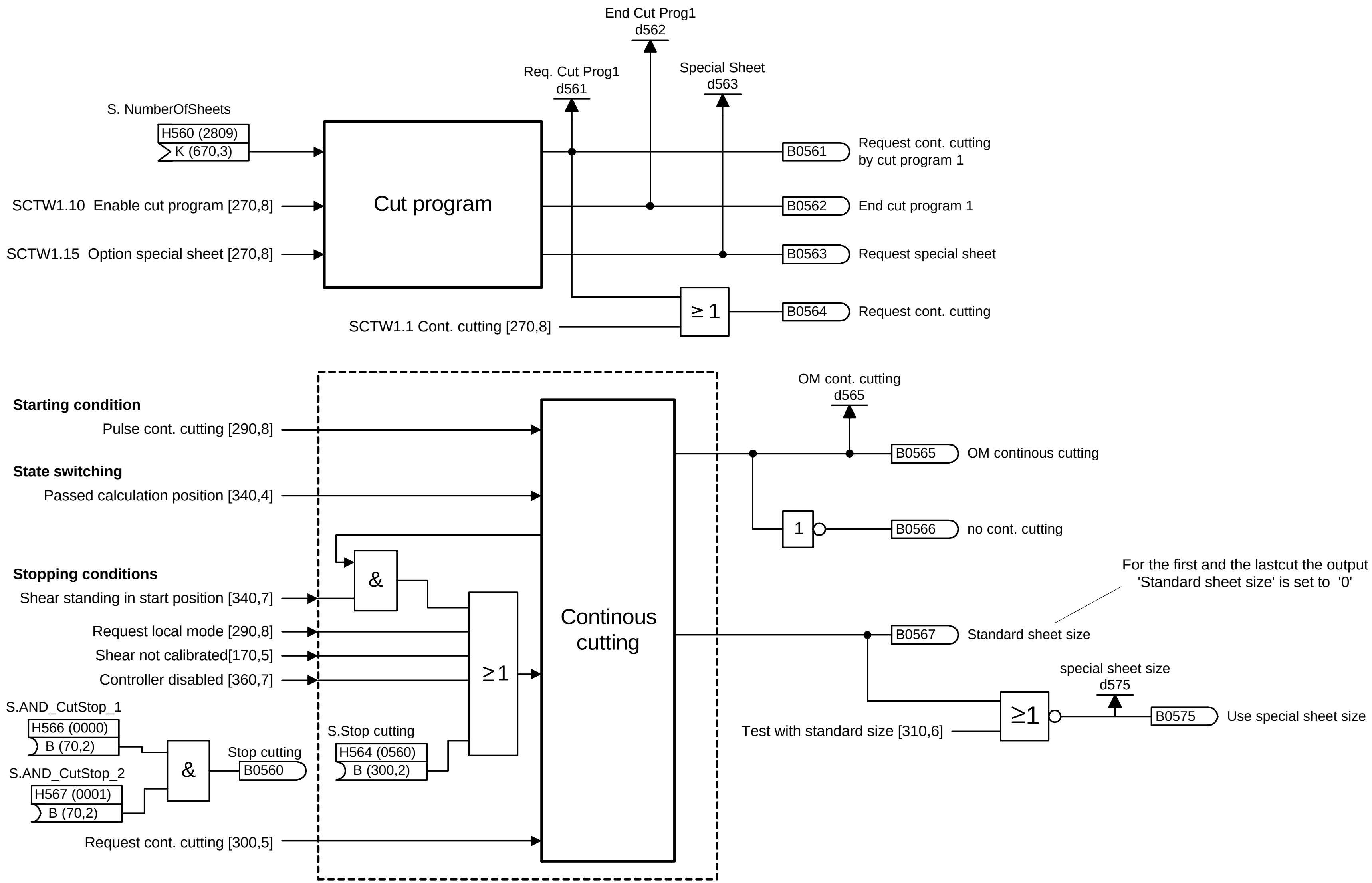

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Steuerung | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 270 - |
| Shear control word (SCTW1) | | | | | 10.01.01 | Sheet cutter / Cut to Length | |



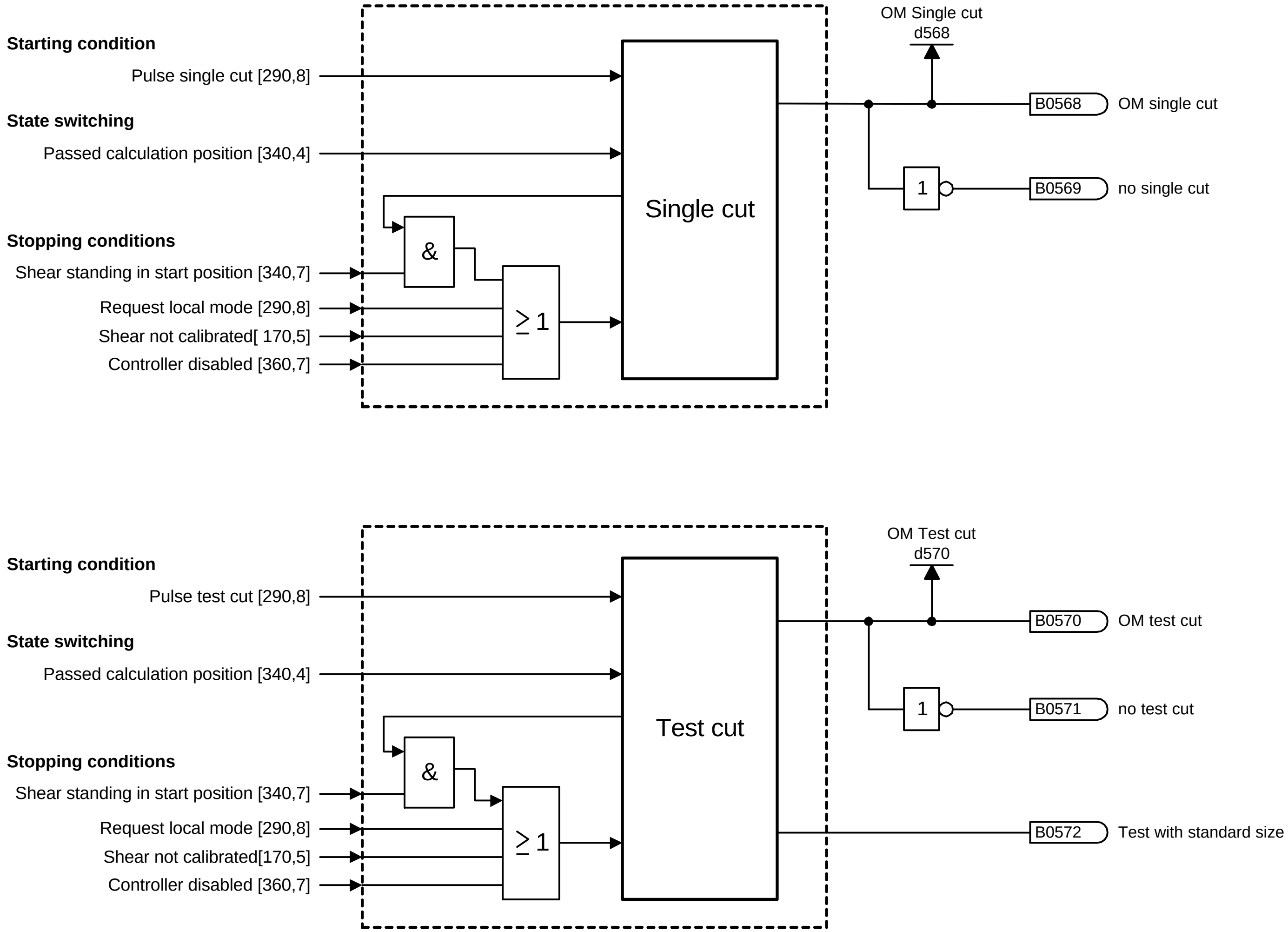

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Control logic | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 280 - |
| Shear control word 2 (SCTW2) | | | | | 10.01.01 | Sheet cutter / Cut to Length | |

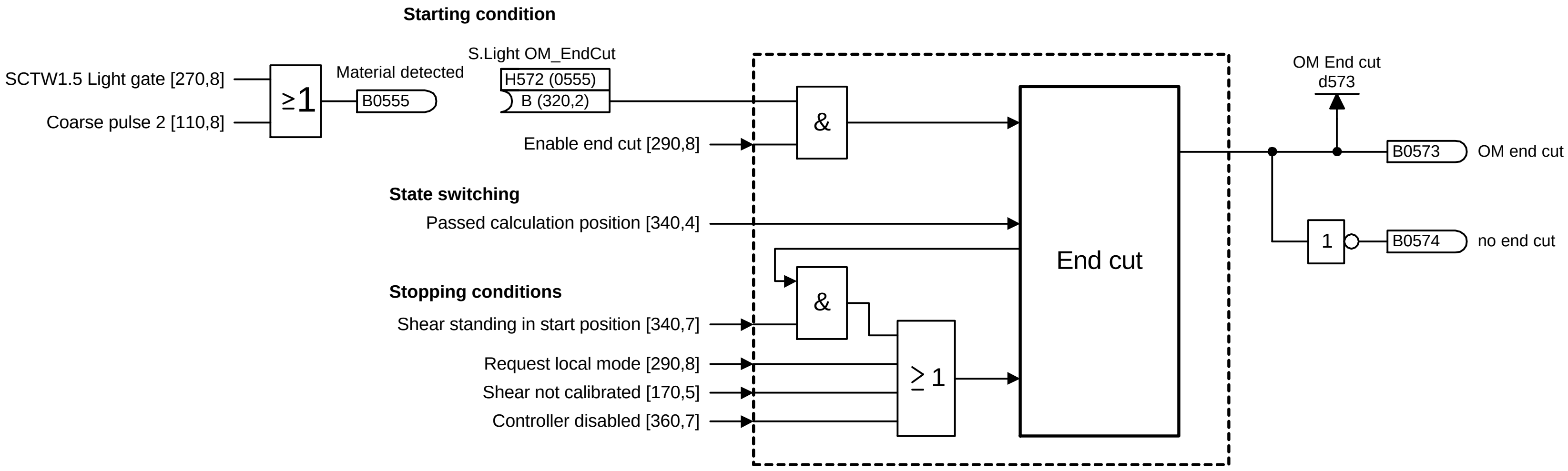


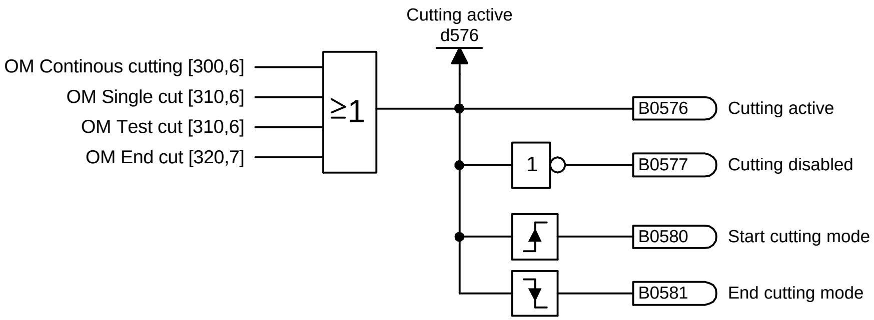

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Control logic | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 290 - |
| Priority handling | | | | | 10.01.01 | Sheet cutter / Cut to Length | |

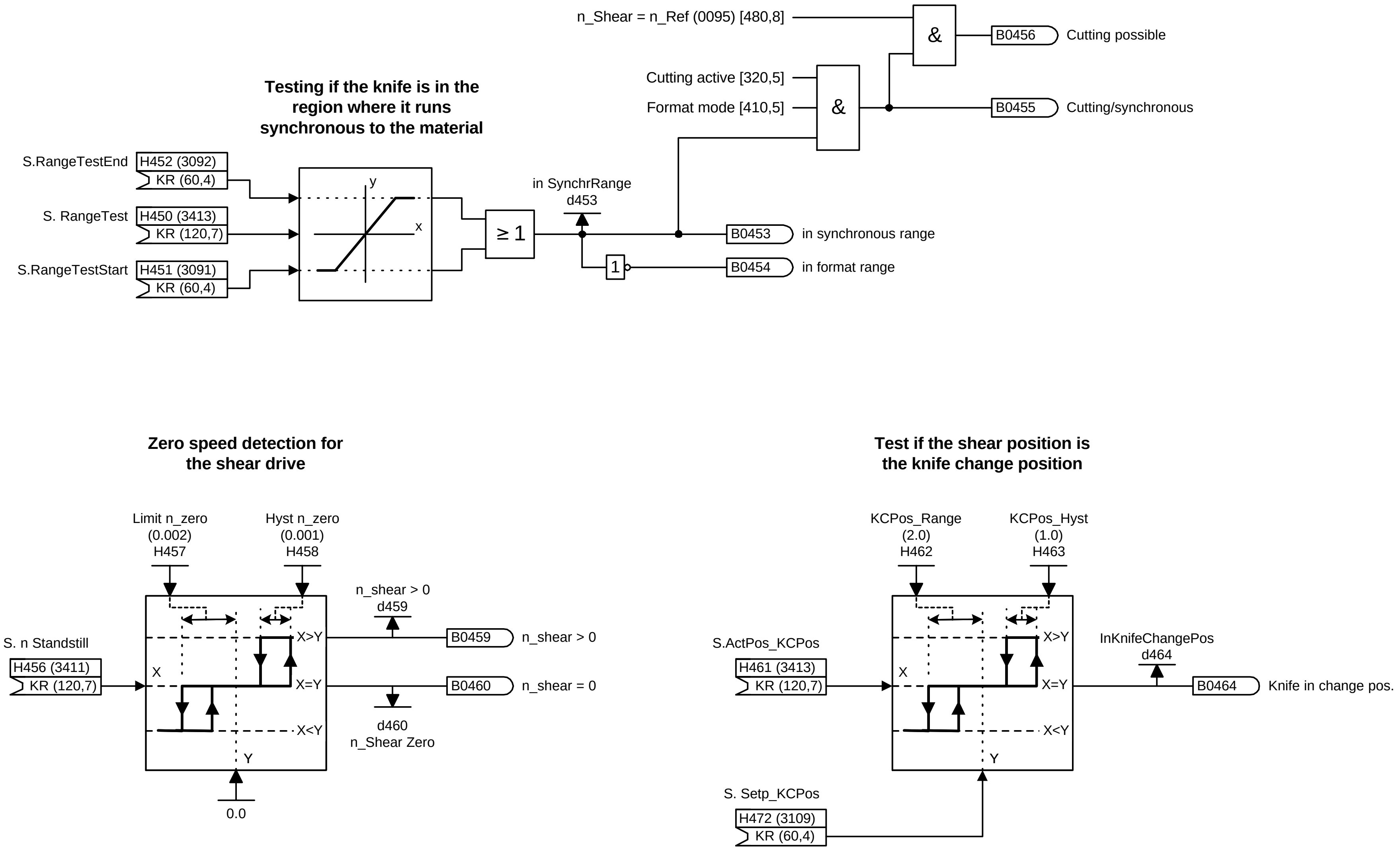



| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Control logic | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 300 - |
| Operation modes 1 | | | | | 10.01.01 | Sheet cutter / Cut to Length | |


Starting condition
Pulse single cut [290,8]
State switching
Passed calculation position [340,4]
Stopping conditions
Shear standing in start position [340,7]
Request local mode [290,8]
Shear not calibrated[ 170,5]
Controller disabled [360,7]
&
≥1
Single cut
OM Single cut
d568
B0568
OM single cut
1
B0569
no single cut
Starting condition
Pulse test cut [290,8]
State switching
Passed calculation position [340,4]
Stopping conditions
Shear standing in start position [340,7]
Request local mode [290,8]
Shear not calibrated[170,5]
Controller disabled [360,7]
&
≥1
Test cut
OM Test cut
d570
B0570
OM test cut
1
B0571
no test cut
B0572
Test with standard size


Starting condition
SCTW1.5 Light gate [270,8]
Coarse pulse 2 [110,8]
≥1
Material detected
B0555
S.Light OM_EndCut
H572 (0555)
B (320,2)
Enable end cut [290,8]
&
State switching
Passed calculation position [340,4]
Stopping conditions
Shear standing in start position [340,7]
Request local mode [290,8]
Shear not calibrated [170,5]
Controller disabled [360,7]
&
≥ 1
End cut
OM End cut
d573
B0573
OM end cut
1
B0574
no end cut

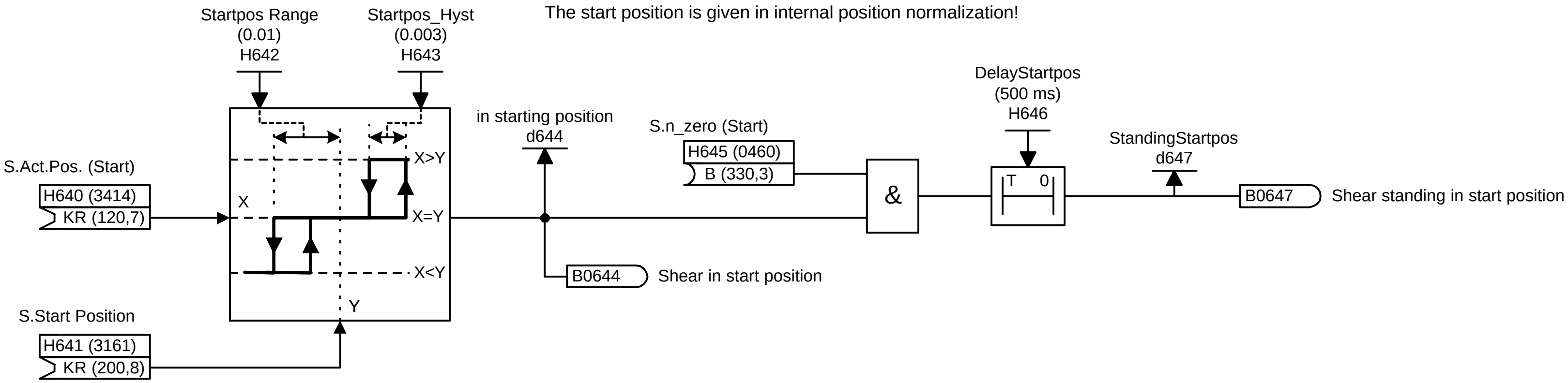

Cutting active
d576
OM Continous cutting [300,6]
OM Single cut [310,6]
OM Test cut [310,6]
OM End cut [320,7]
≥1
B0576
Cutting active
1
B0577
Cutting disabled
B0580
Start cutting mode
B0581
End cutting mode



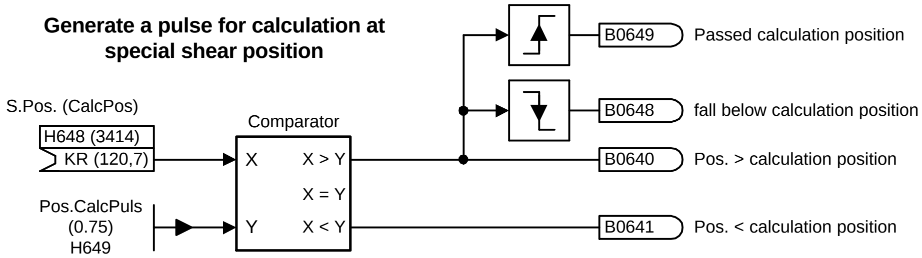

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Control logic | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 330 - |
| Range monitoring 1 | | | | | 10.01.01 | Sheet cutter / Cut to Length | |

## Testing if the shear is standing in start position

The start position is given in internal position normalization!

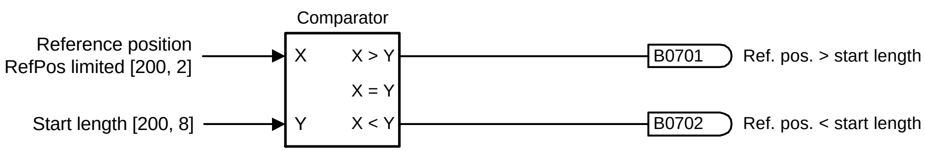



## Generate a pulse for calculation at special shear position

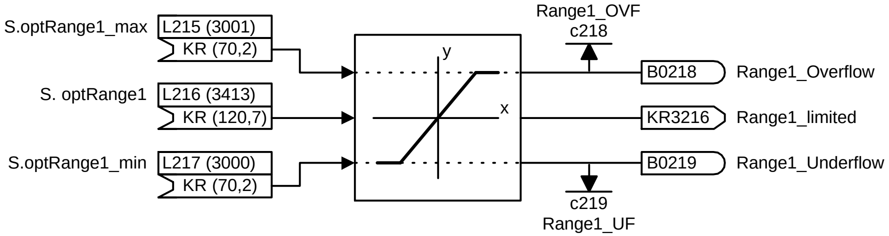



## Is the material position bigger than "start length"?

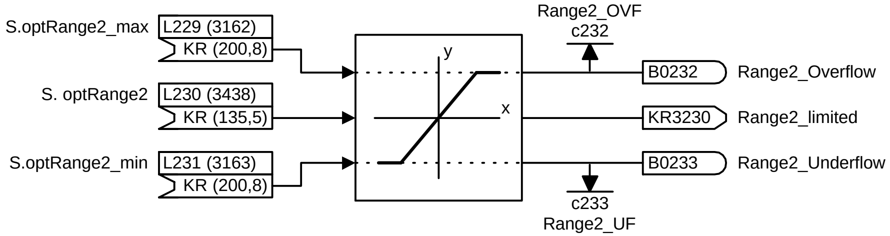
(After passing the "start length" the shear starts accelerating to web speed (true with big sheets or linear systems) )



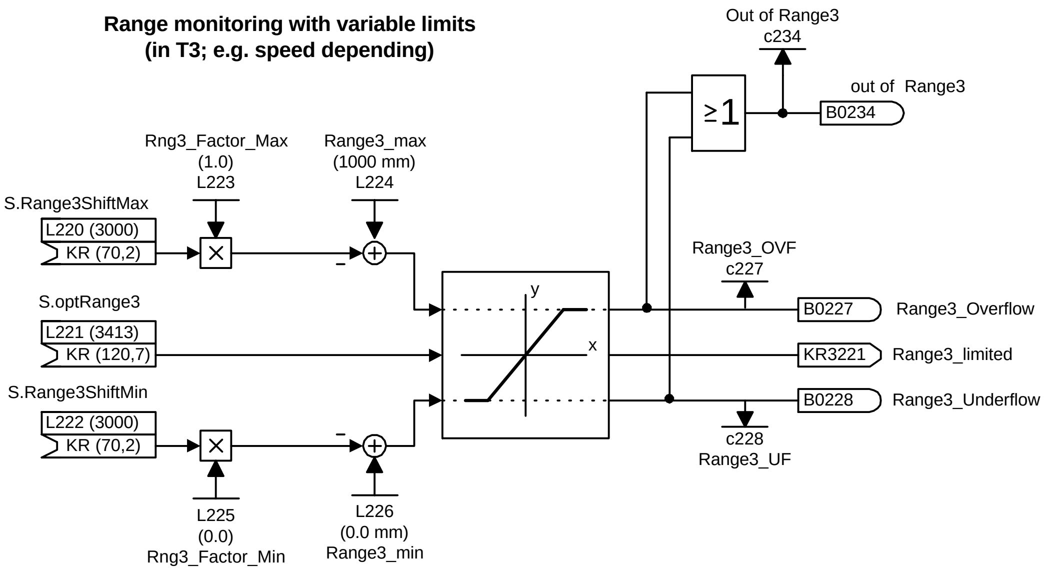
**Watching or limitation of the shear position (T3)**

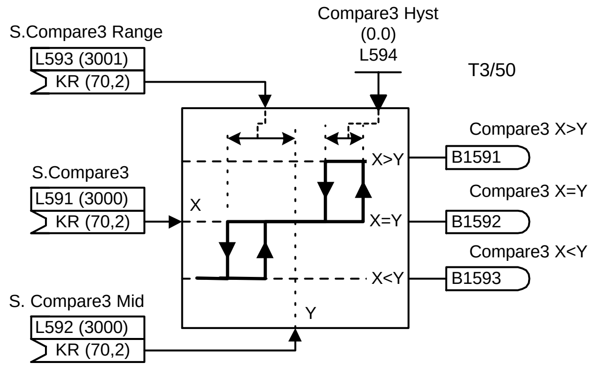



**Watching or limiting an actual value position (in T3)**



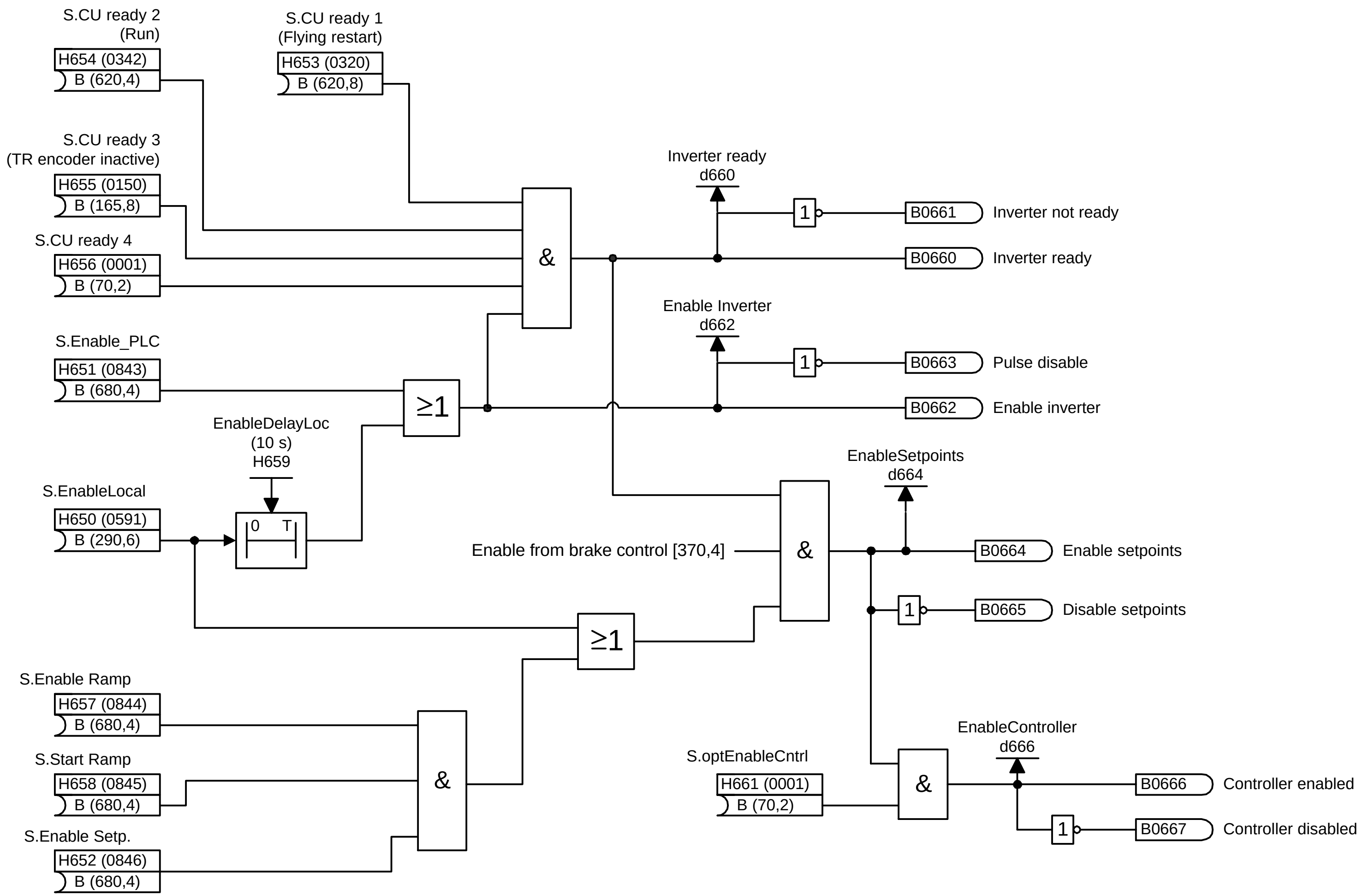

**Range monitoring with variable limits (in T3; e.g. speed depending)**



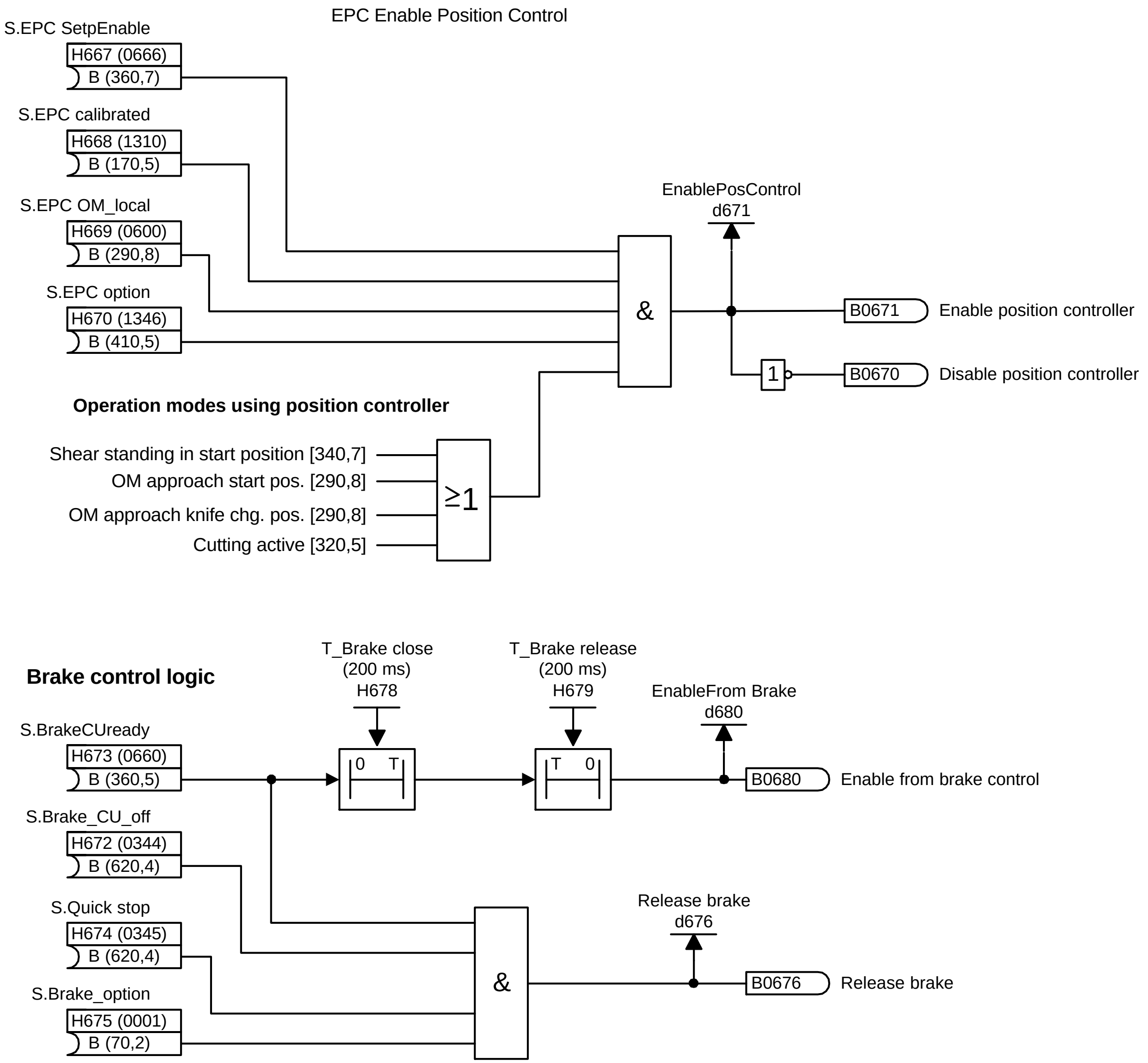



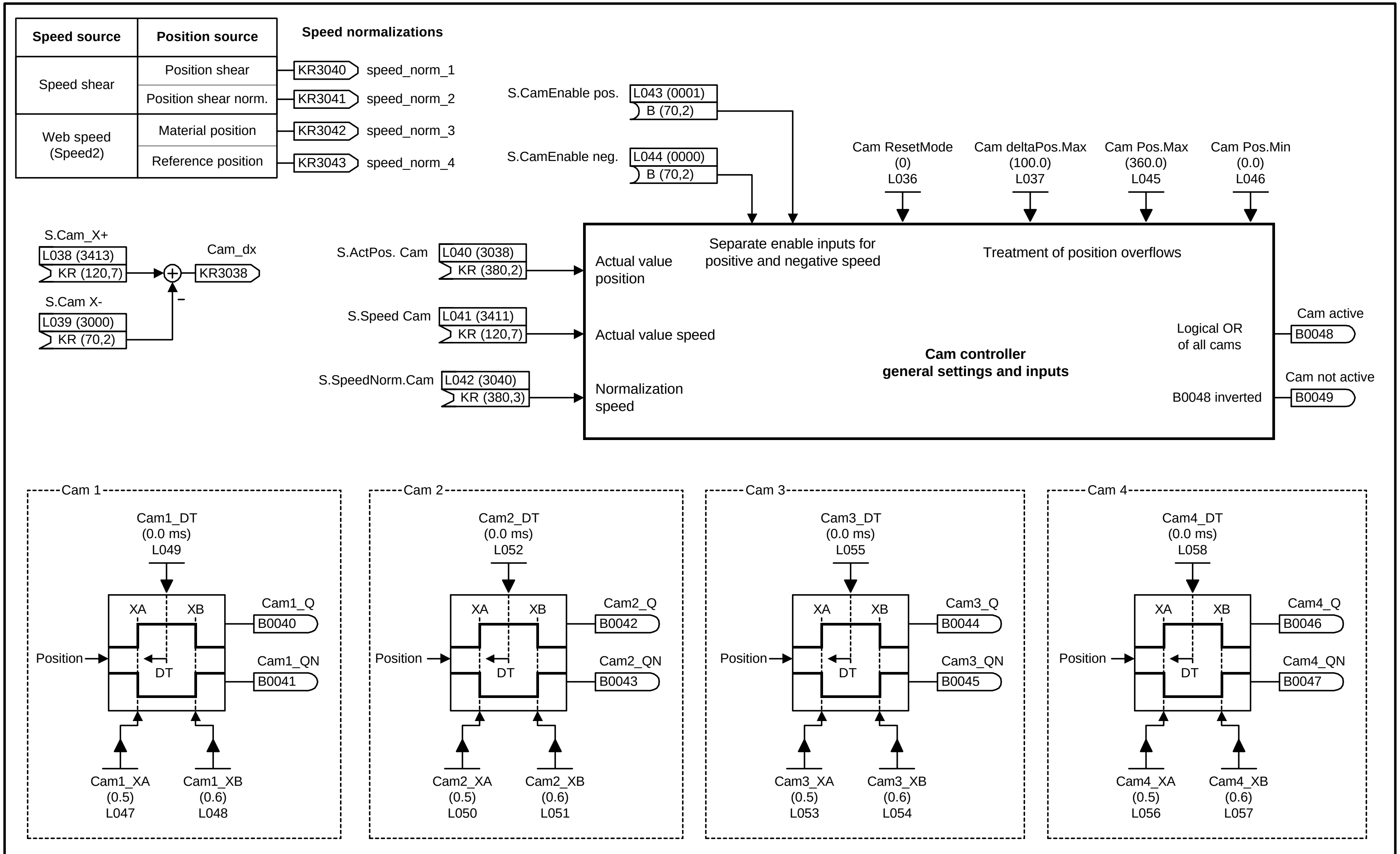

The monitoring and limitation function of this chart are for free usage.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Control logic | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 350 - |
| Range monitoring 3 | | | | | 10.01.01 | Sheet cutter / Cut to Length | |

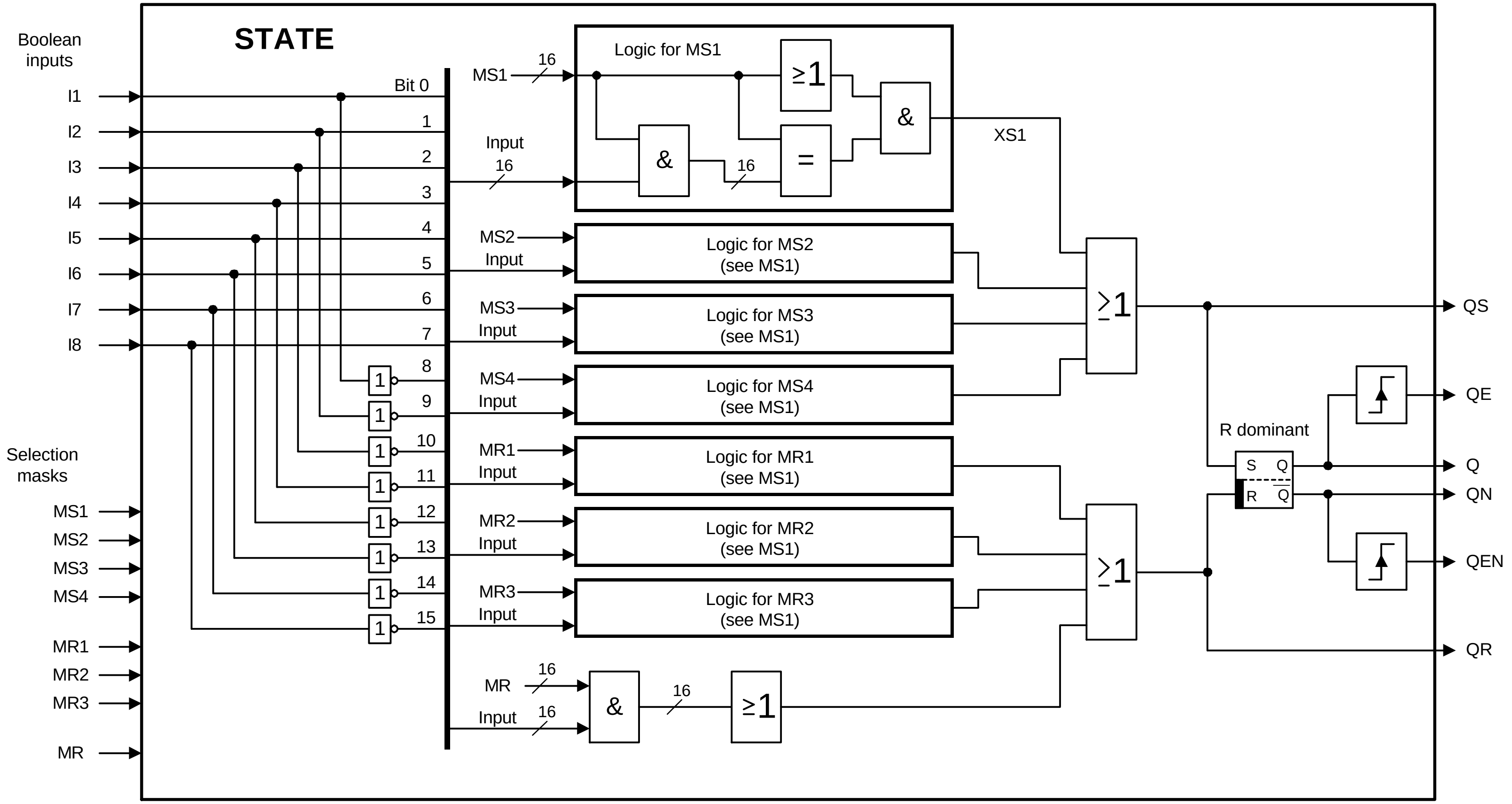



| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Control logic | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 360 - |
| Enable inverter / setpoints / controller | | | | | 10.01.01 | Sheet cutter / Cut to Length | |


EPC Enable Position Control
S.EPC SetpEnable
H667 (0666)
B (360,7)
S.EPC calibrated
H668 (1310)
B (170,5)
S.EPC OM_local
H669 (0600)
B (290,8)
S.EPC option
H670 (1346)
B (410,5)
&
EnablePosControl
d671
B0671
Enable position controller
1
B0670
Disable position controller
Operation modes using position controller
Shear standing in start position [340,7]
OM approach start pos. [290,8]
OM approach knife chg. pos. [290,8]
Cutting active [320,5]
≥1
Brake control logic
T_Brake close
(200 ms)
H678
T_Brake release
(200 ms)
H679
EnableFrom Brake
d680
S.BrakeCUready
H673 (0660)
B (360,5)
0 T
T 0
B0680
Enable from brake control
S.Brake_CU_off
H672 (0344)
B (620,4)
S.Quick stop
H674 (0345)
B (620,4)
S.Brake_option
H675 (0001)
B (70,2)
&
Release brake
d676
B0676
Release brake




| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Control logic | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 380 - |
| Cam group | | | | | 10.01.01 | Sheet cutter / Cut to Length | |



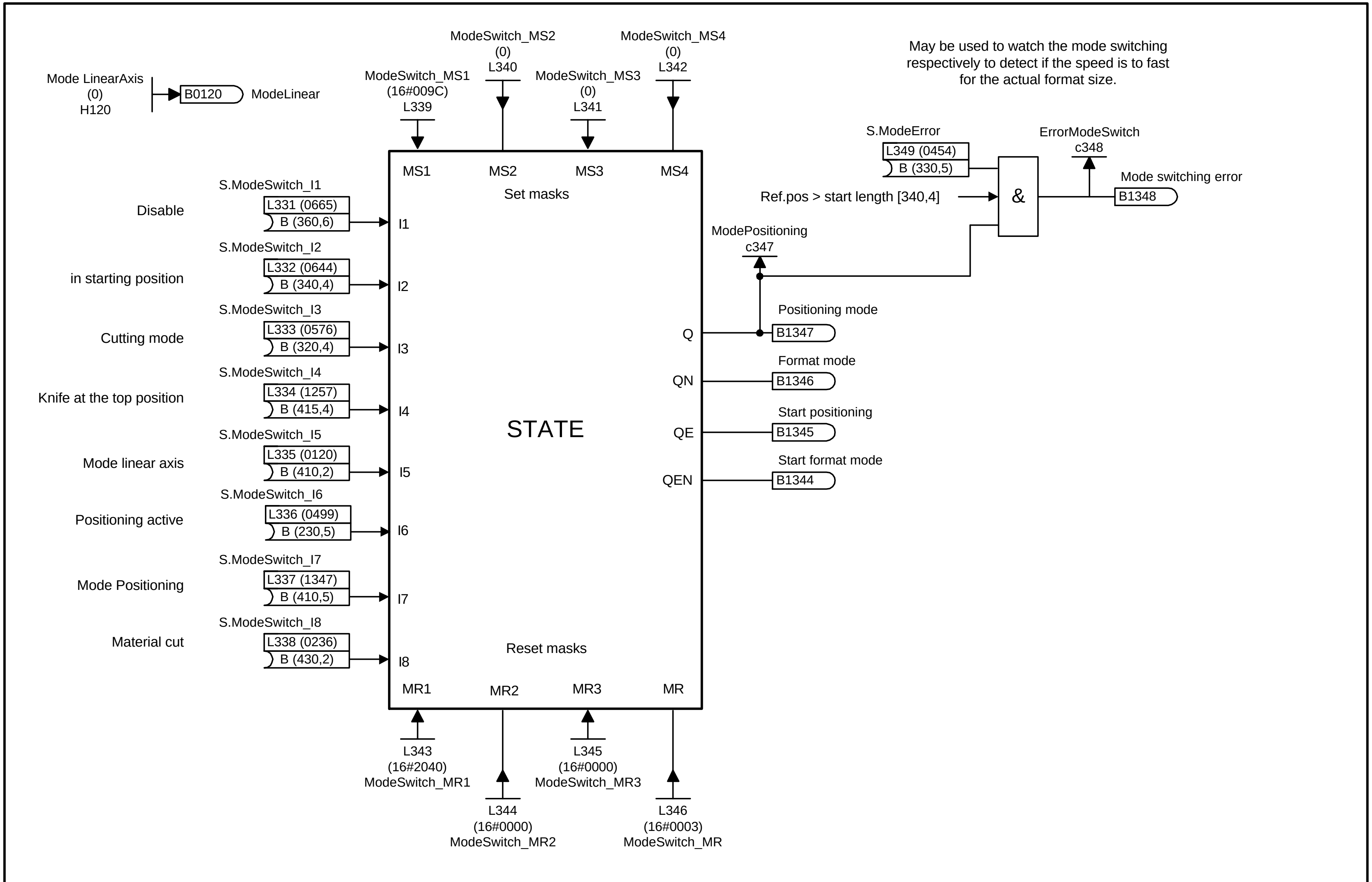

**Masks**

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bit | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| corresponding input | $\overline{I8}$ | $\overline{I7}$ | $\overline{I6}$ | $\overline{I5}$ | $\overline{I4}$ | $\overline{I3}$ | $\overline{I2}$ | $\overline{I1}$ | I8 | I7 | I6 | I5 | I4 | I3 | I2 | I1 |

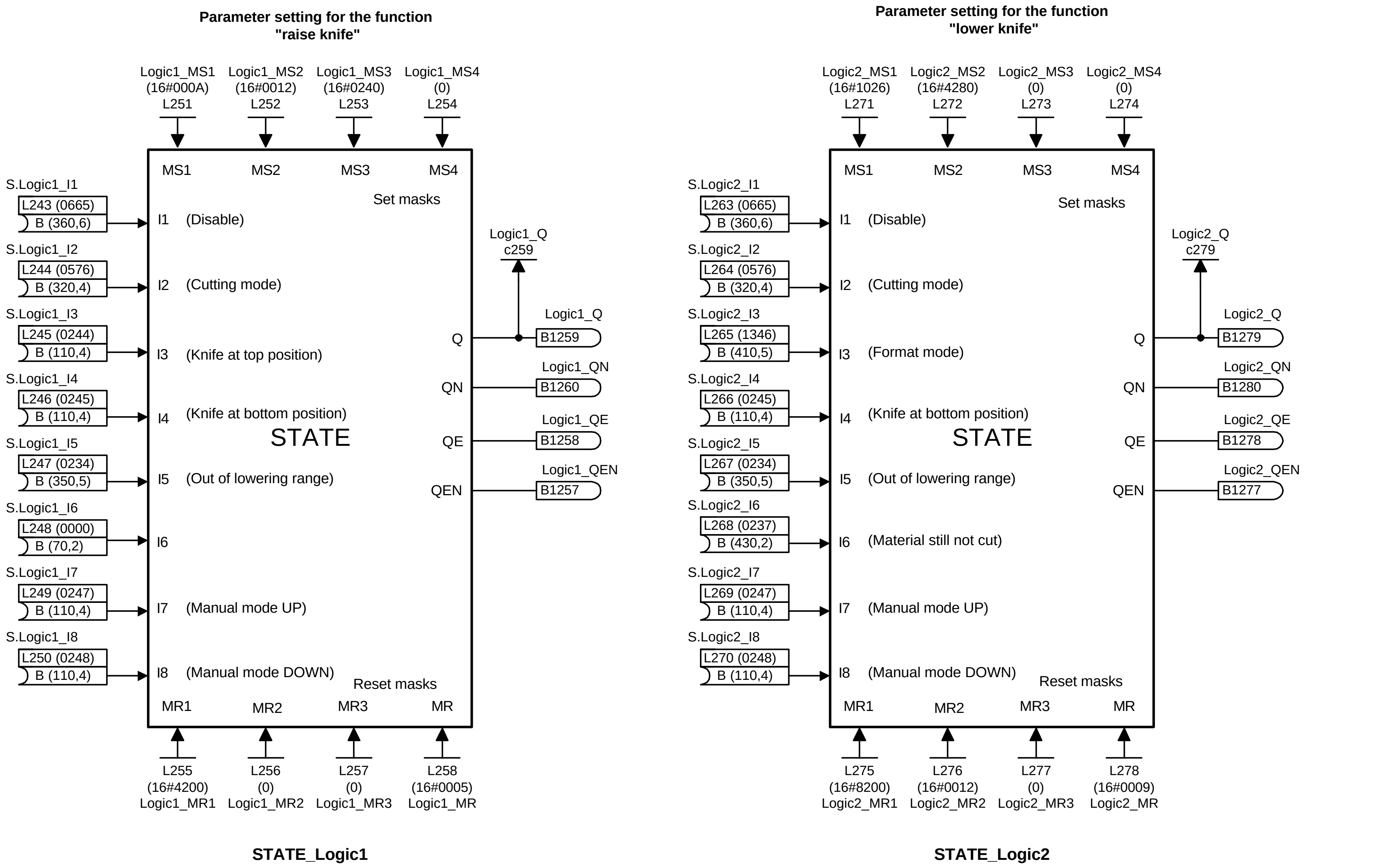
**Note:**
XS1 is set to 1 if all bits of the "Input" quantity masked by MS1 are set '1'.

**Example:** MS1 = 16#3080 = 0011 0000 1000 0000b

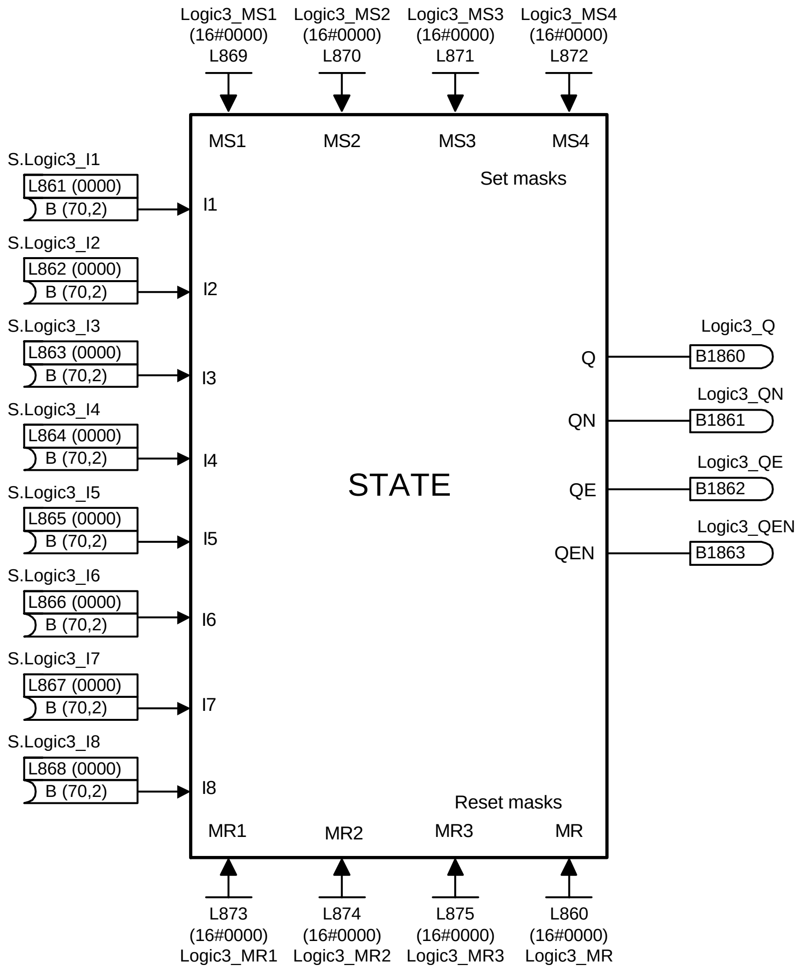
**Corresponding logic function:** **XS1 =** $\mathbf{\overline{I6} \cdot \overline{I5} \cdot I8}$



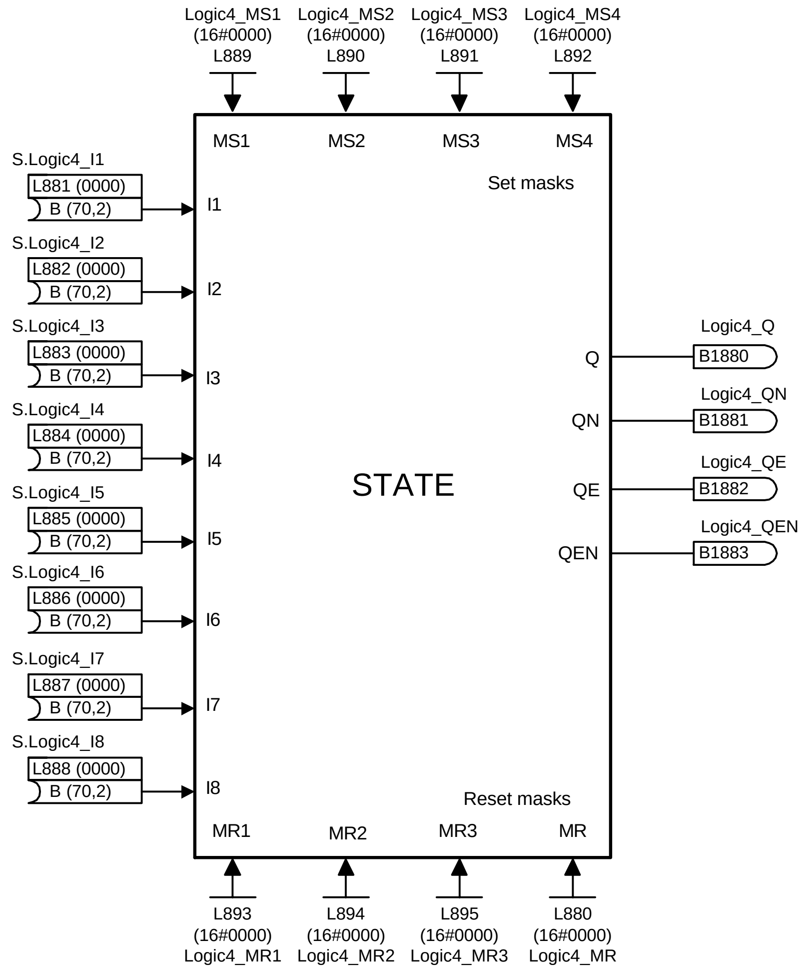

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Free function blocks | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 410 - |
| Mode switching (positioning/format mode) | | | | | 10.01.01 | Sheet cutter / Cut to Length | |




| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Free function blocks | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 415 - |
| Parametrizable logic 1 (raise/lower knife) | | | | | 10.01.01 | Sheet cutter / Cut to Length | |

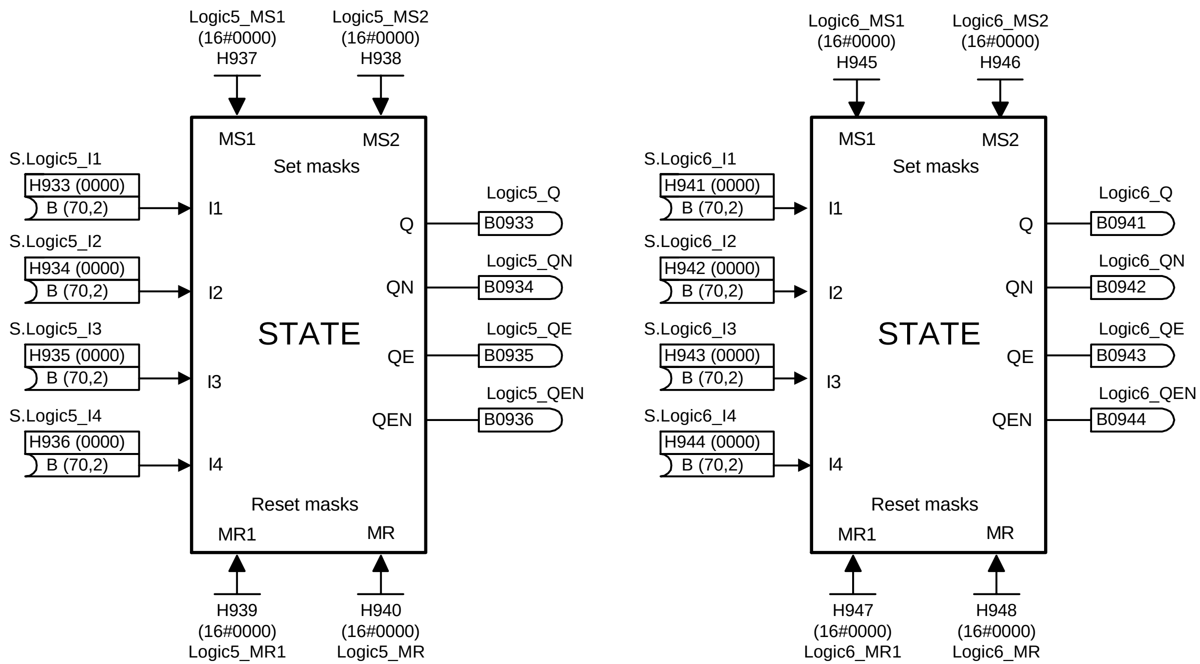



**STATE_Logic3**




**STATE_Logic4**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Free function blocks | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 420 - |
| Parameterizable logic 2 | | | | | 10.01.01 | Sheet cutter / Cut to Length | |

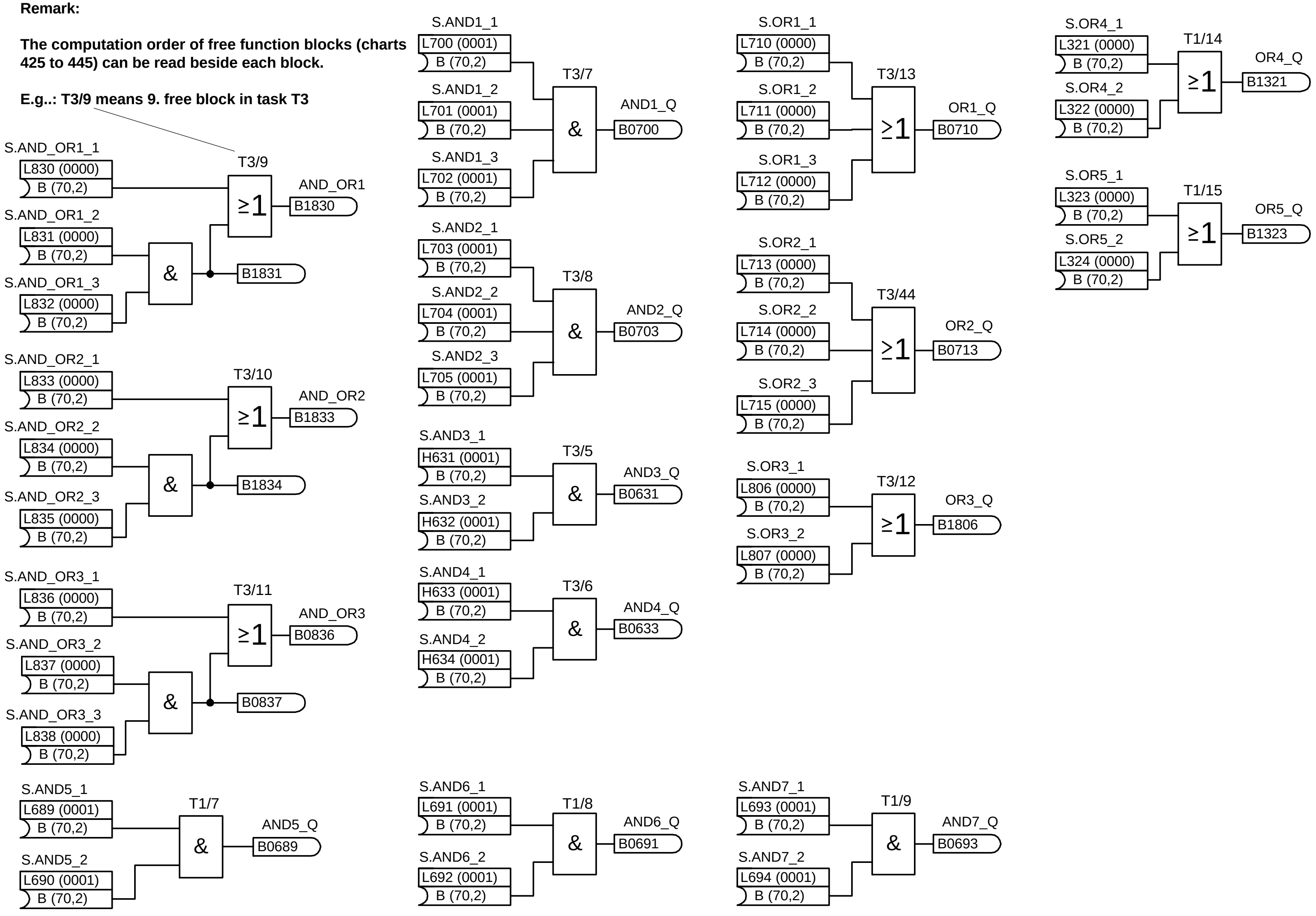


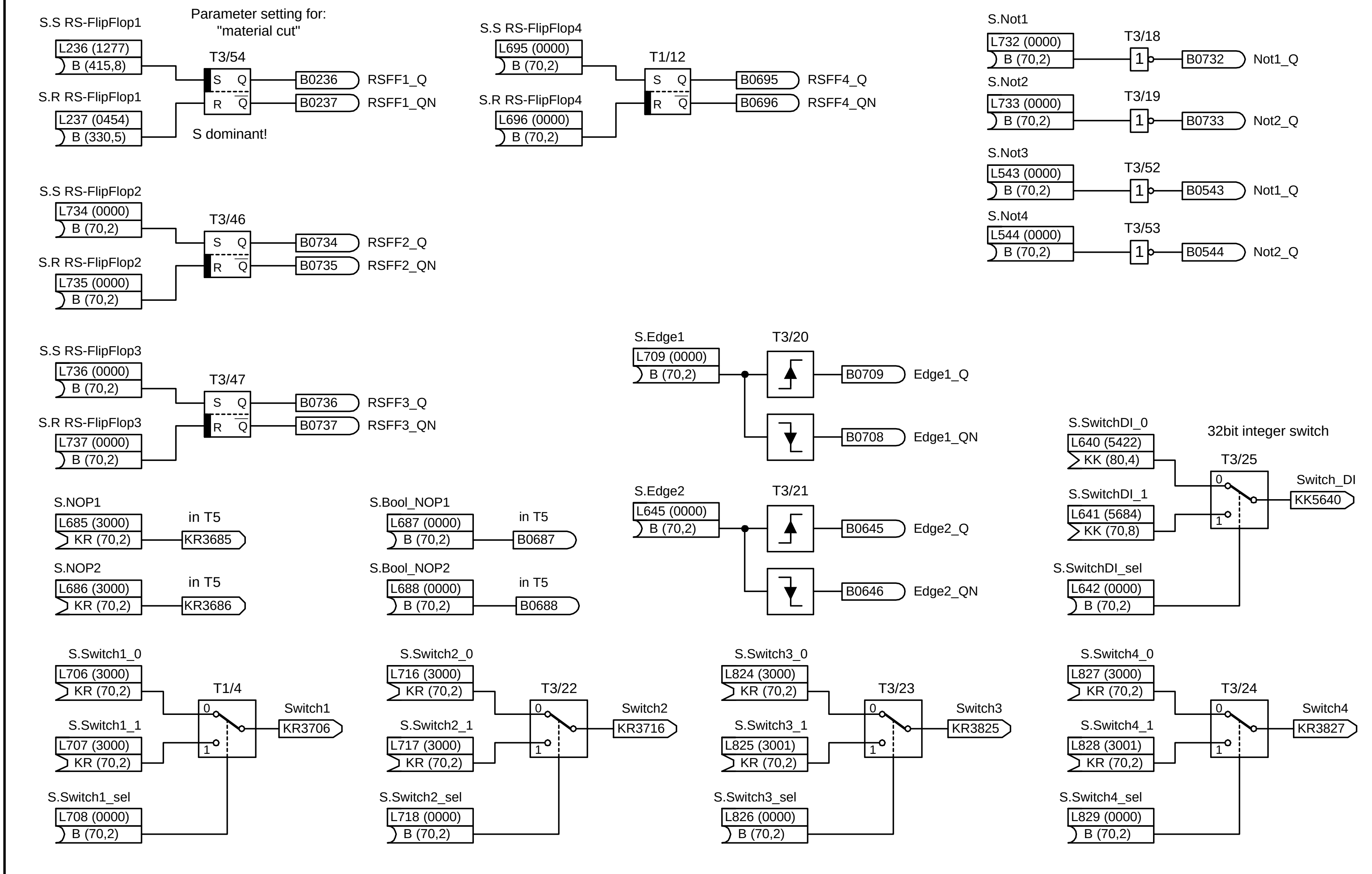

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Free function blocks | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 421 - |
| Parameterizable logic 3 | | | | | 10.01.01 | Sheet cutter / Cut to Length | |

**Remark:**

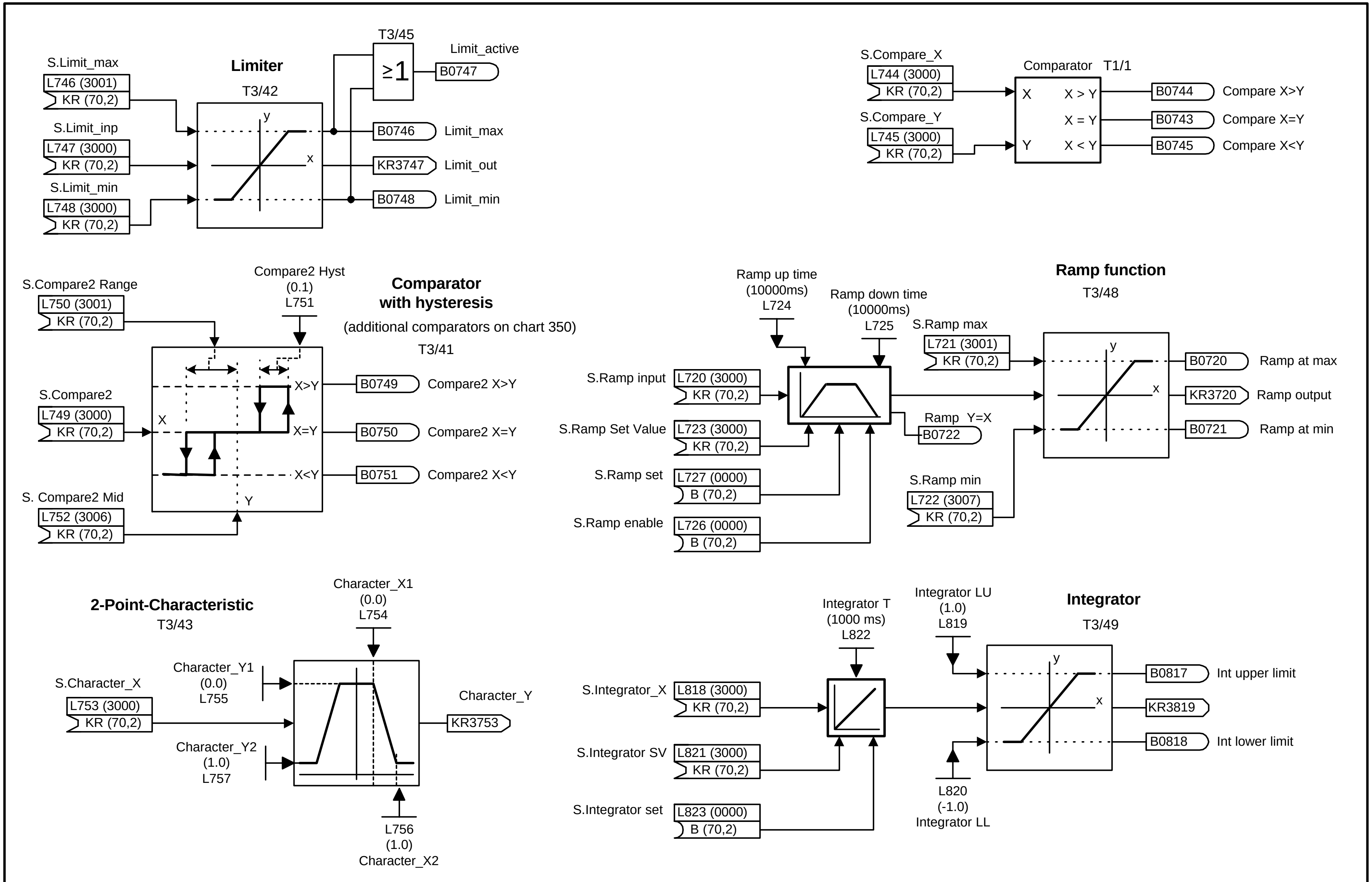
**The computation order of free function blocks (charts 425 to 445) can be read beside each block.**

**E.g..: T3/9 means 9. free block in task T3**

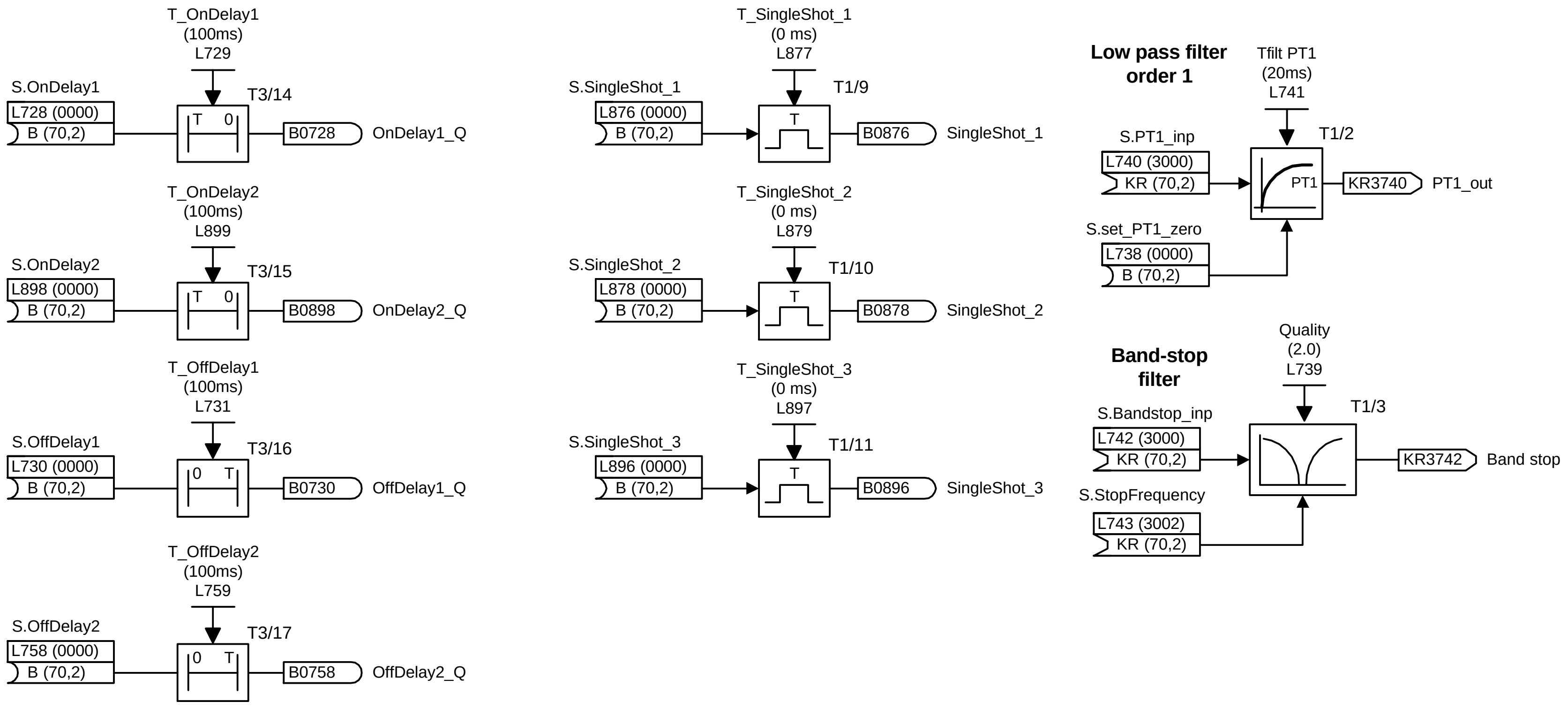




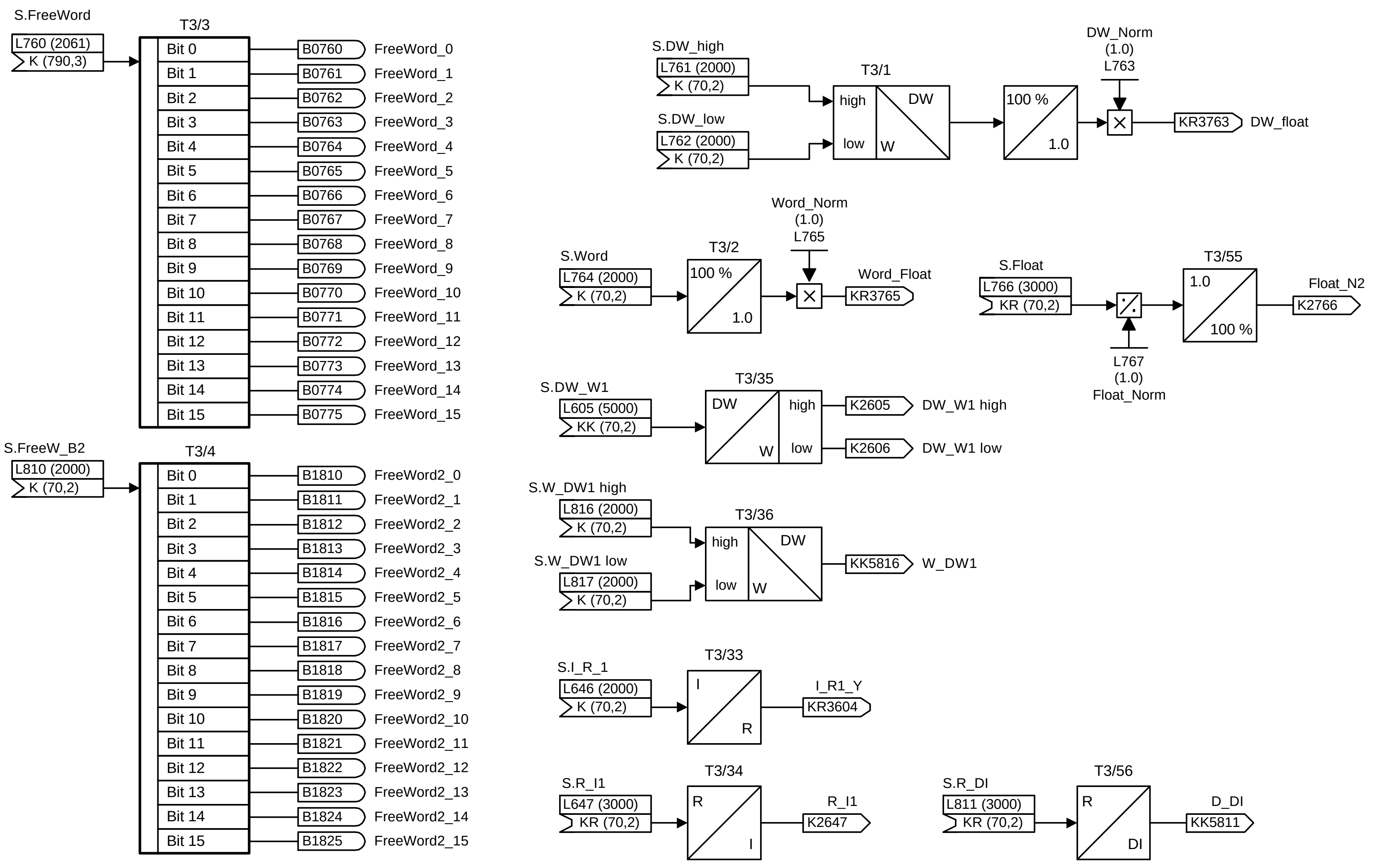

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Free function blocks | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 430 - |
| Miscellaneous functions | | | | | 10.01.01 | Sheet cutter / Cut to Length | |



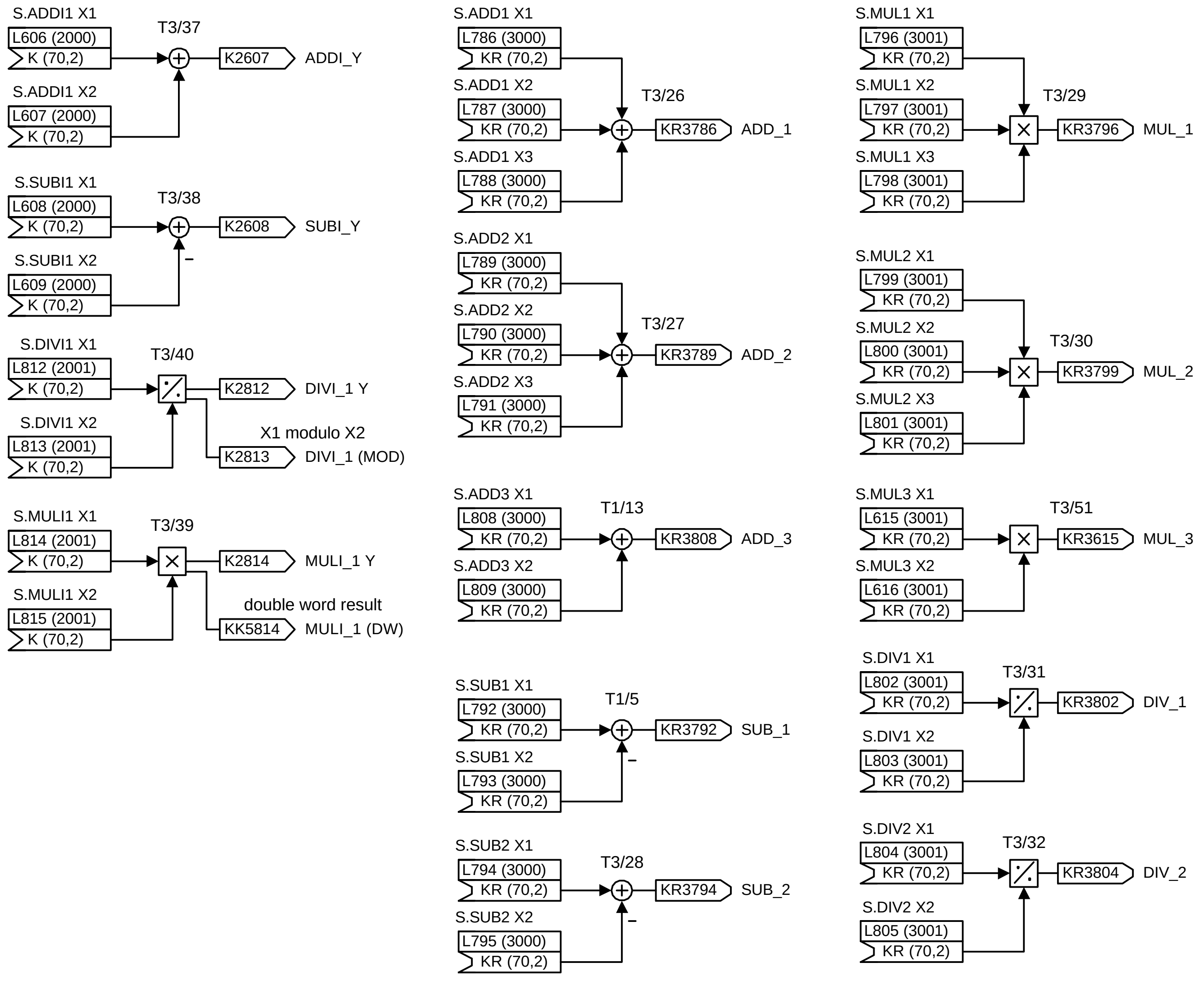

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Free function blocks | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 435 - |
| Control functions | | | | | 10.01.01 | Sheet cutter / Cut to Length | |



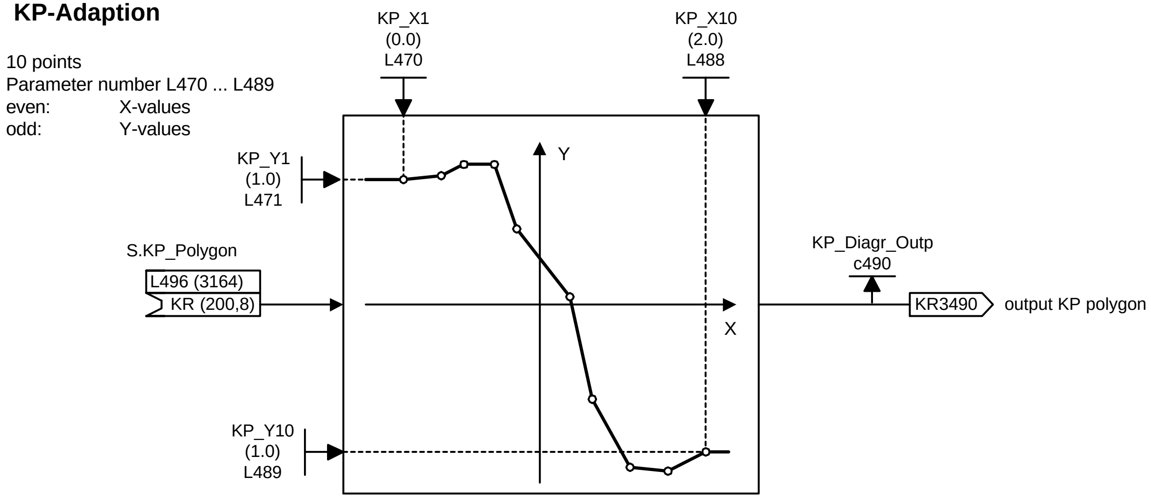
T_OnDelay1
(100ms)
L729
S.OnDelay1
L728 (0000)
B (70,2)
T3/14
T 0
B0728
OnDelay1_Q
T_OnDelay2
(100ms)
L899
S.OnDelay2
L898 (0000)
B (70,2)
T3/15
T 0
B0898
OnDelay2_Q
T_OffDelay1
(100ms)
L731
S.OffDelay1
L730 (0000)
B (70,2)
T3/16
0 T
B0730
OffDelay1_Q
T_OffDelay2
(100ms)
L759
S.OffDelay2
L758 (0000)
B (70,2)
T3/17
0 T
B0758
OffDelay2_Q
T_SingleShot_1
(0 ms)
L877
S.SingleShot_1
L876 (0000)
B (70,2)
T1/9
T
B0876
SingleShot_1
T_SingleShot_2
(0 ms)
L879
S.SingleShot_2
L878 (0000)
B (70,2)
T1/10
T
B0878
SingleShot_2
T_SingleShot_3
(0 ms)
L897
S.SingleShot_3
L896 (0000)
B (70,2)
T1/11
T
B0896
SingleShot_3
Low pass filter
order 1
Tfilt PT1
(20ms)
L741
T1/2
S.PT1_inp
L740 (3000)
KR (70,2)
PT1
KR3740
PT1_out
S.set_PT1_zero
L738 (0000)
B (70,2)
Band-stop
filter
Quality
(2.0)
L739
T1/3
S.Bandstop_inp
L742 (3000)
KR (70,2)
KR3742
Band stop
S.StopFrequency
L743 (3002)
KR (70,2)



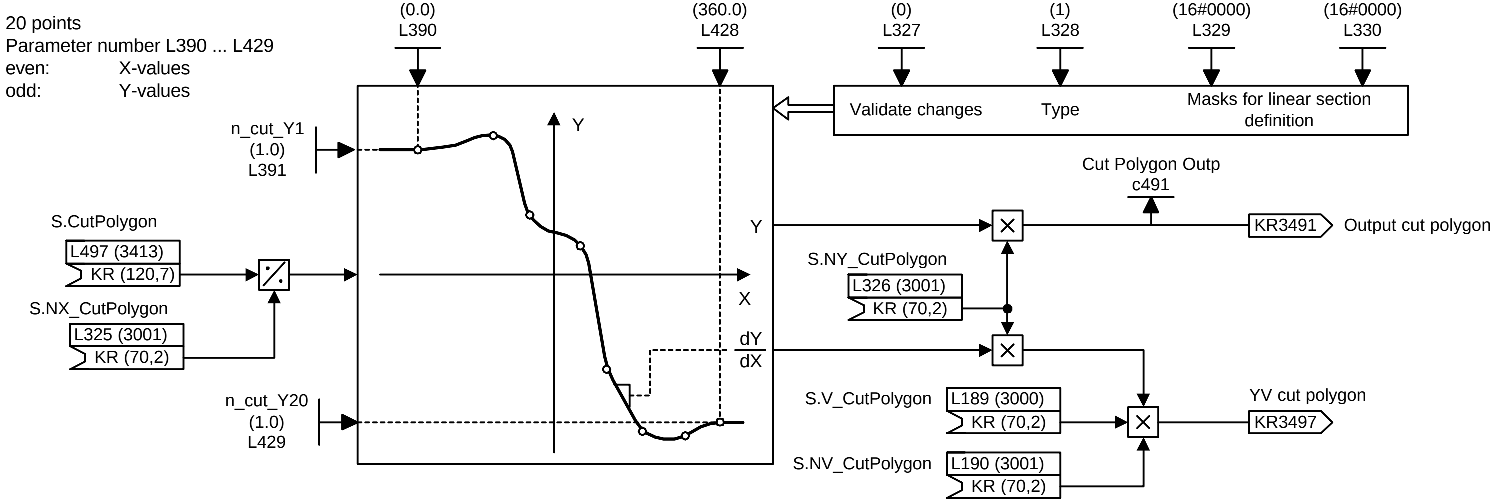

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Free function blocks | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 440 - |
| Type conversion | | | | | 10.01.01 | Sheet cutter / Cut to Length | |


S.ADDI1 X1
L606 (2000)
K (70,2)
T3/37
K2607
ADDI_Y
S.ADDI1 X2
L607 (2000)
K (70,2)
S.SUBI1 X1
L608 (2000)
K (70,2)
T3/38
K2608
SUBI_Y
S.SUBI1 X2
L609 (2000)
K (70,2)
S.DIVI1 X1
L812 (2001)
K (70,2)
T3/40
K2812
DIVI_1 Y
S.DIVI1 X2
L813 (2001)
K (70,2)
X1 modulo X2
K2813
DIVI_1 (MOD)
S.MULI1 X1
L814 (2001)
K (70,2)
T3/39
K2814
MULI_1 Y
S.MULI1 X2
L815 (2001)
K (70,2)
double word result
KK5814
MULI_1 (DW)
S.ADD1 X1
L786 (3000)
KR (70,2)
S.ADD1 X2
L787 (3000)
KR (70,2)
T3/26
KR3786
ADD_1
S.ADD1 X3
L788 (3000)
KR (70,2)
S.ADD2 X1
L789 (3000)
KR (70,2)
S.ADD2 X2
L790 (3000)
KR (70,2)
T3/27
KR3789
ADD_2
S.ADD2 X3
L791 (3000)
KR (70,2)
S.ADD3 X1
L808 (3000)
KR (70,2)
T1/13
KR3808
ADD_3
S.ADD3 X2
L809 (3000)
KR (70,2)
S.SUB1 X1
L792 (3000)
KR (70,2)
T1/5
KR3792
SUB_1
S.SUB1 X2
L793 (3000)
KR (70,2)
S.SUB2 X1
L794 (3000)
KR (70,2)
T3/28
KR3794
SUB_2
S.SUB2 X2
L795 (3000)
KR (70,2)
S.MUL1 X1
L796 (3001)
KR (70,2)
S.MUL1 X2
L797 (3001)
KR (70,2)
T3/29
KR3796
MUL_1
S.MUL1 X3
L798 (3001)
KR (70,2)
S.MUL2 X1
L799 (3001)
KR (70,2)
S.MUL2 X2
L800 (3001)
KR (70,2)
T3/30
KR3799
MUL_2
S.MUL2 X3
L801 (3001)
KR (70,2)
S.MUL3 X1
L615 (3001)
KR (70,2)
T3/51
KR3615
MUL_3
S.MUL3 X2
L616 (3001)
KR (70,2)
S.DIV1 X1
L802 (3001)
KR (70,2)
T3/31
KR3802
DIV_1
S.DIV1 X2
L803 (3001)
KR (70,2)
S.DIV2 X1
L804 (3001)
KR (70,2)
T3/32
KR3804
DIV_2
S.DIV2 X2
L805 (3001)
KR (70,2)

## KP-Adaption



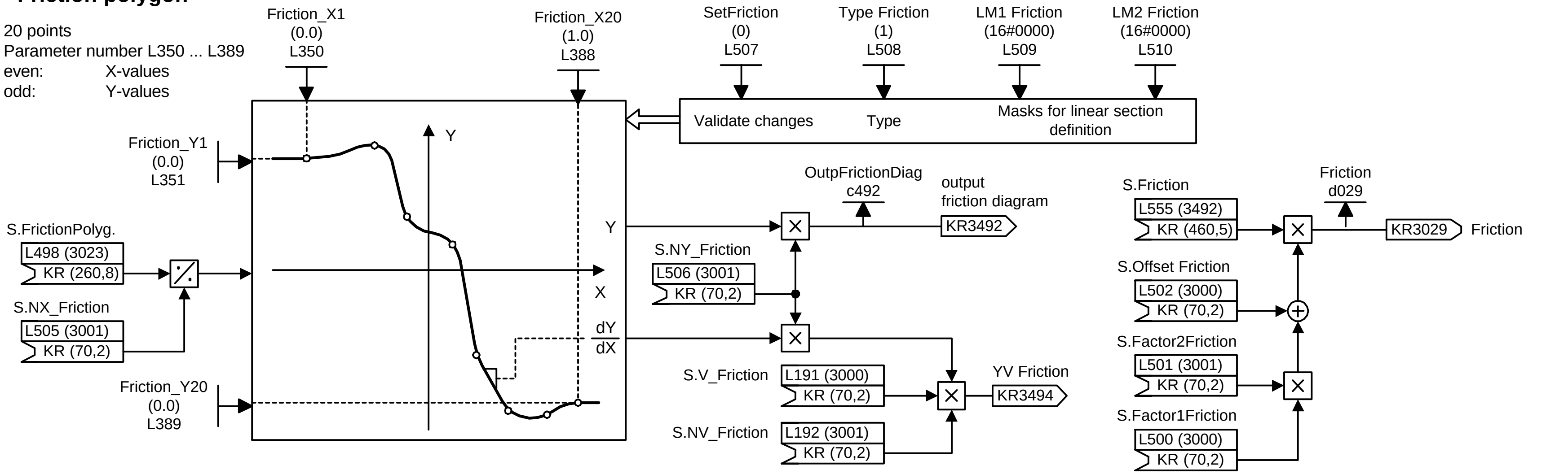

## Cut Polygon
## Speed = f(Position)




| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Polygons | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 450 - |
| KP_Adaption and cut polygon | | | | | 10.01.01 | Sheet cutter / Cut to Length | |

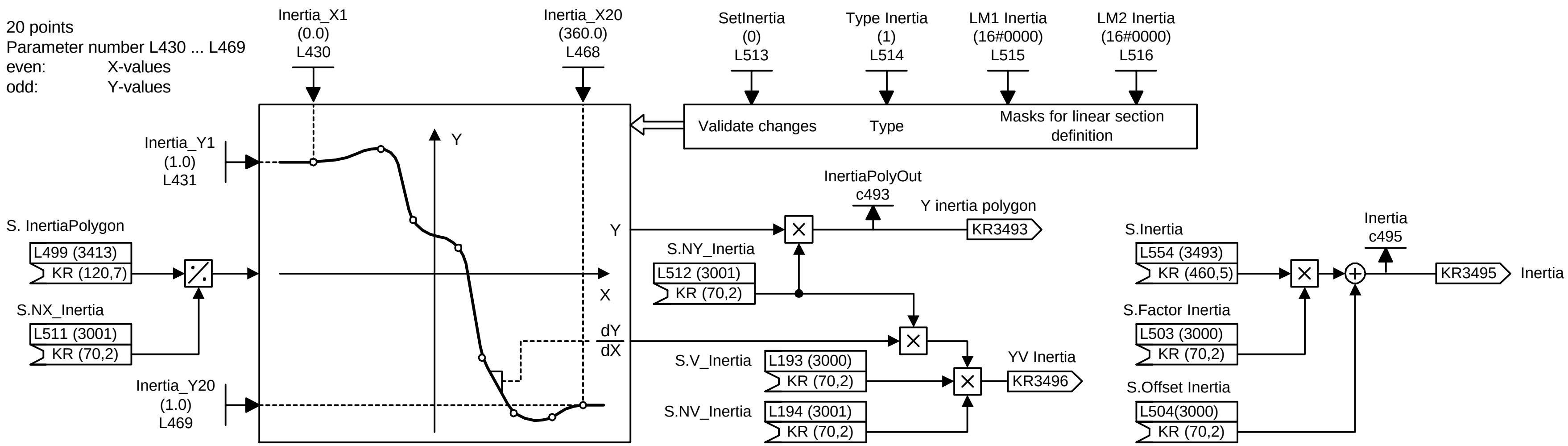
## Friction polygon

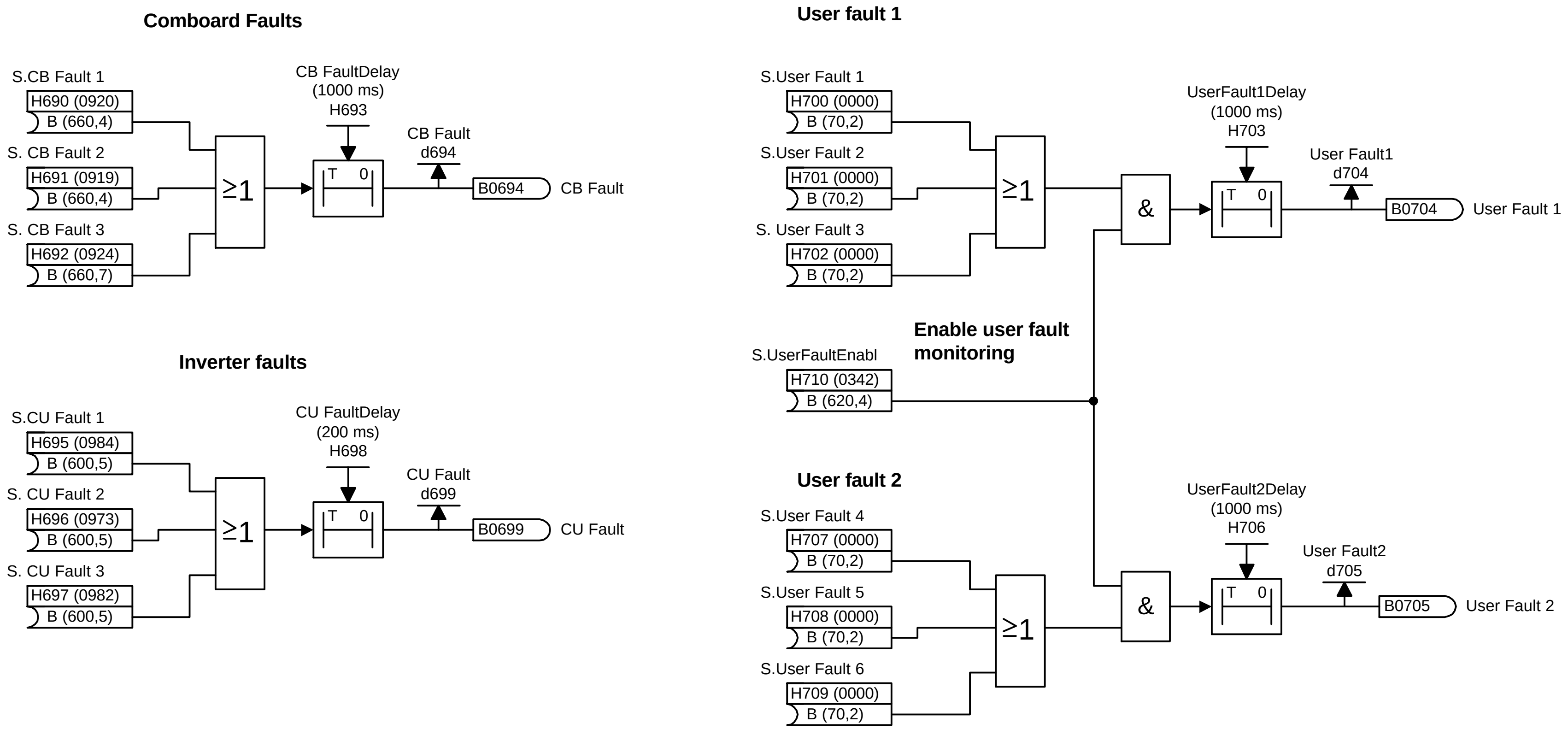
20 points
Parameter number L350 ... L389
even: X-values
odd: Y-values



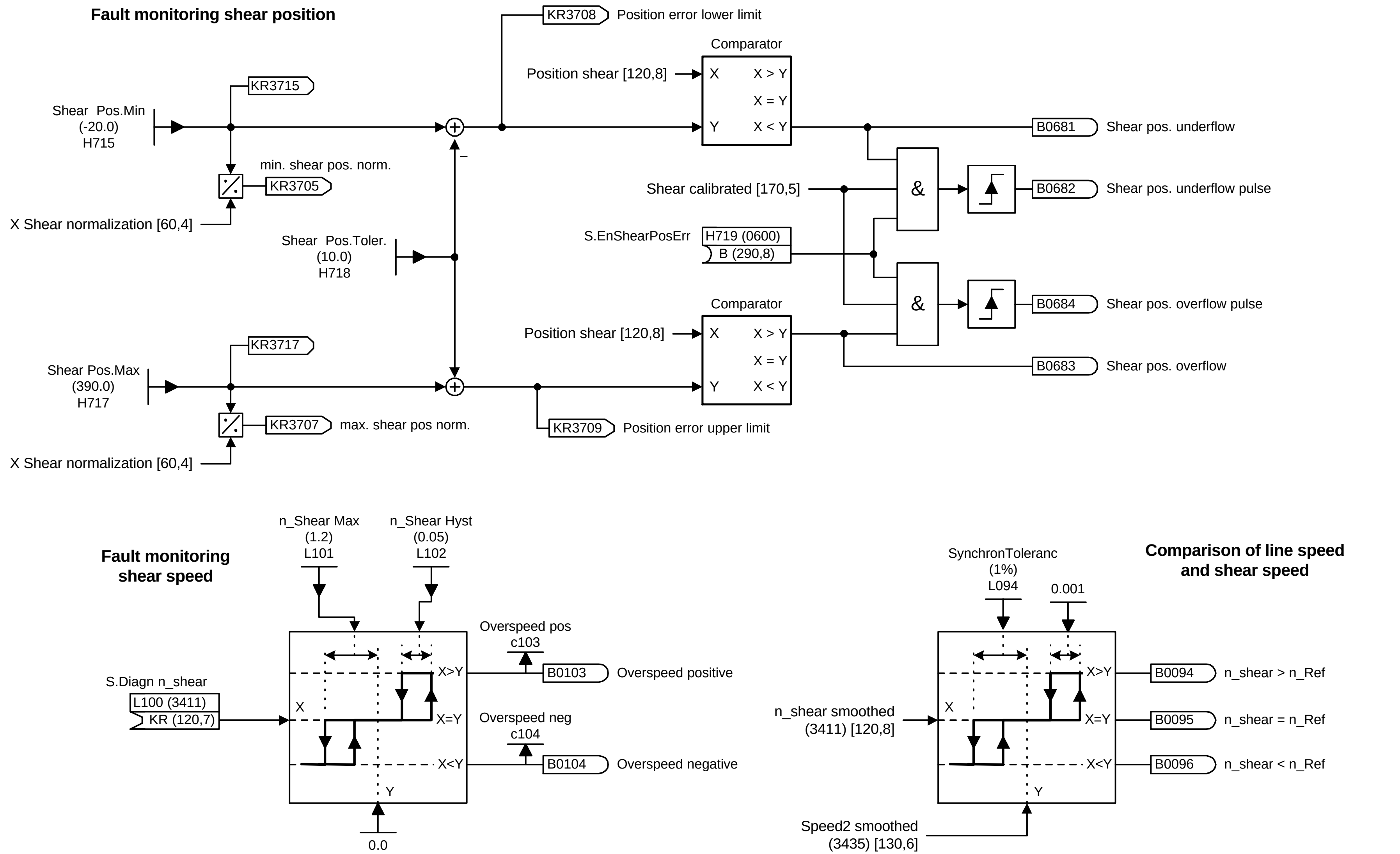

## Inertia = f(shear position)

20 points
Parameter number L430 ... L469
even: X-values
odd: Y-values

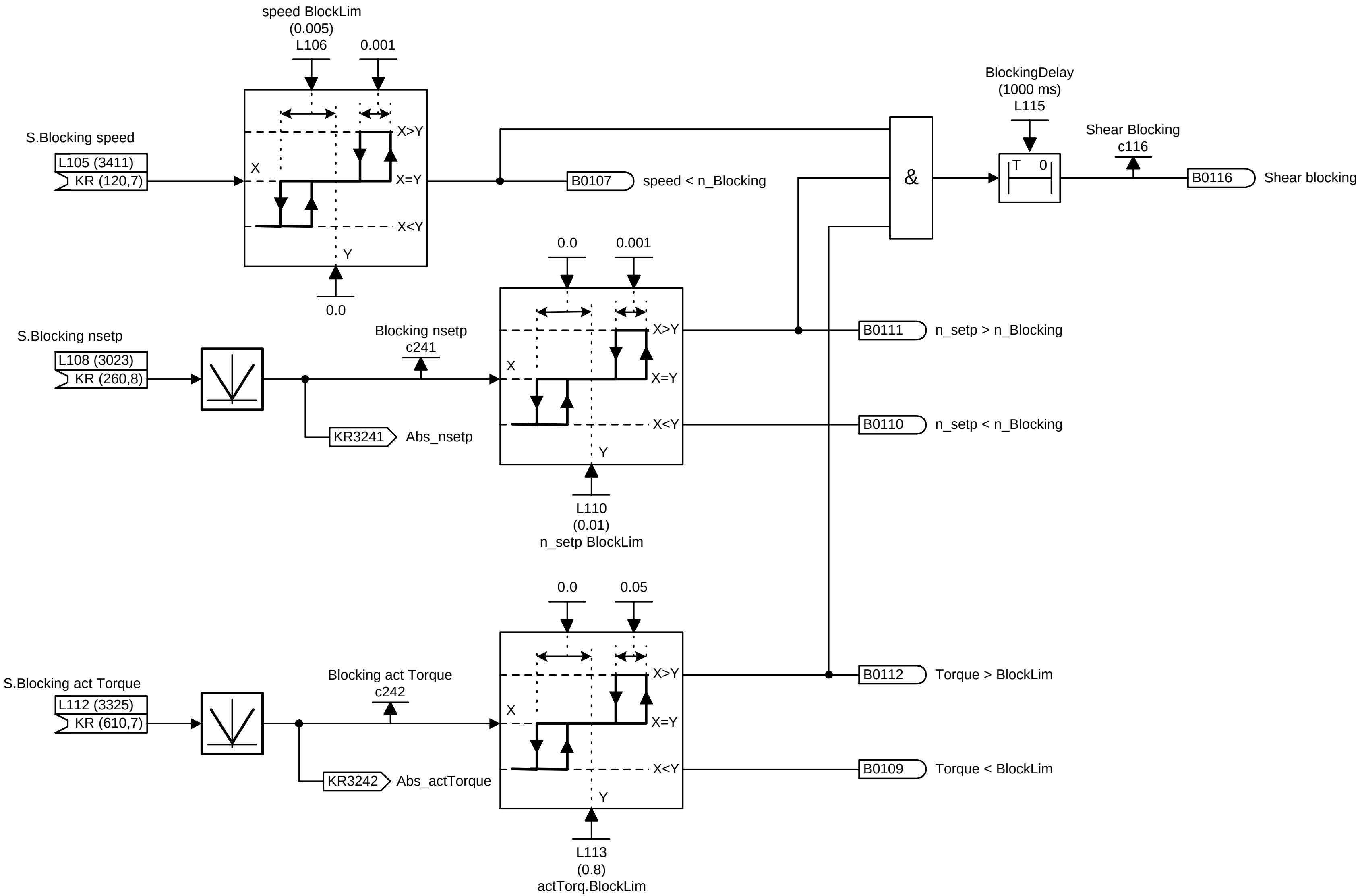





| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Diagnostics | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 470 - |
| CU-, CB- and user fault | | | | | 10.01.01 | Sheet cutter / Cut to Length | |



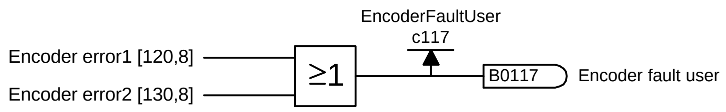

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Diagnostics | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 480 - |
| Shear position and speed | | | | | 10.01.01 | Sheet cutter / Cut to Length | |




| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| Diagnostics | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 490 - |
| Blocking protection | | 10.01.01 | Sheet cutter / Cut to Length | |

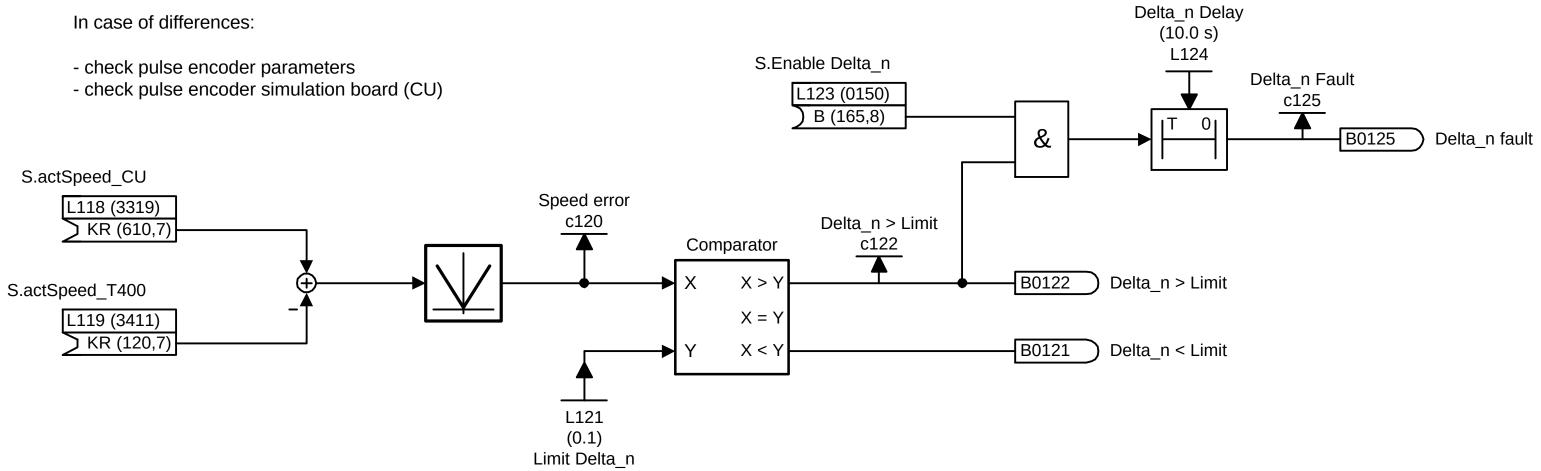
**User fault: incorrect parameter set**



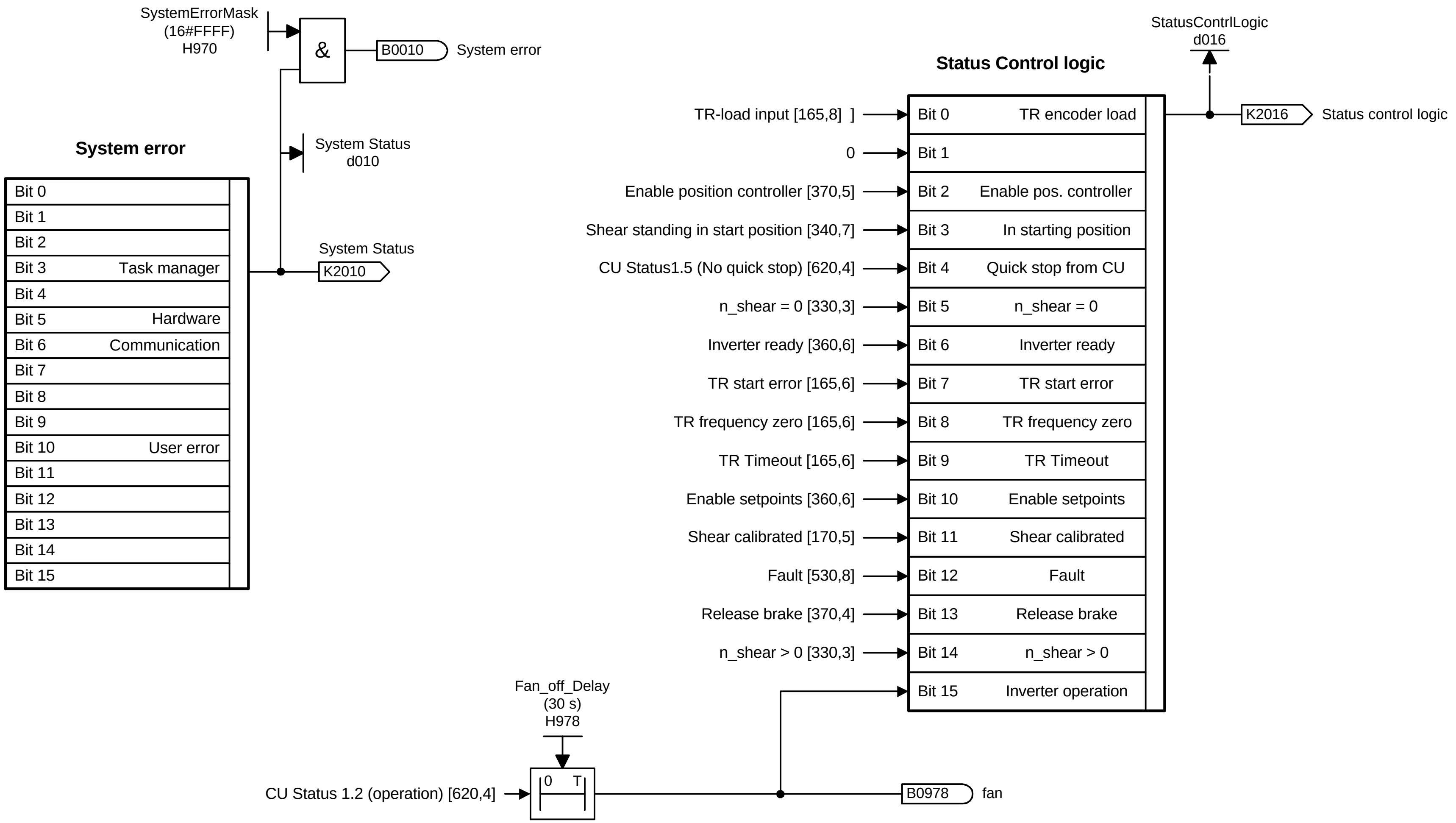

**Comparison of measured speed on T400 with speed from CU**

In case of differences:

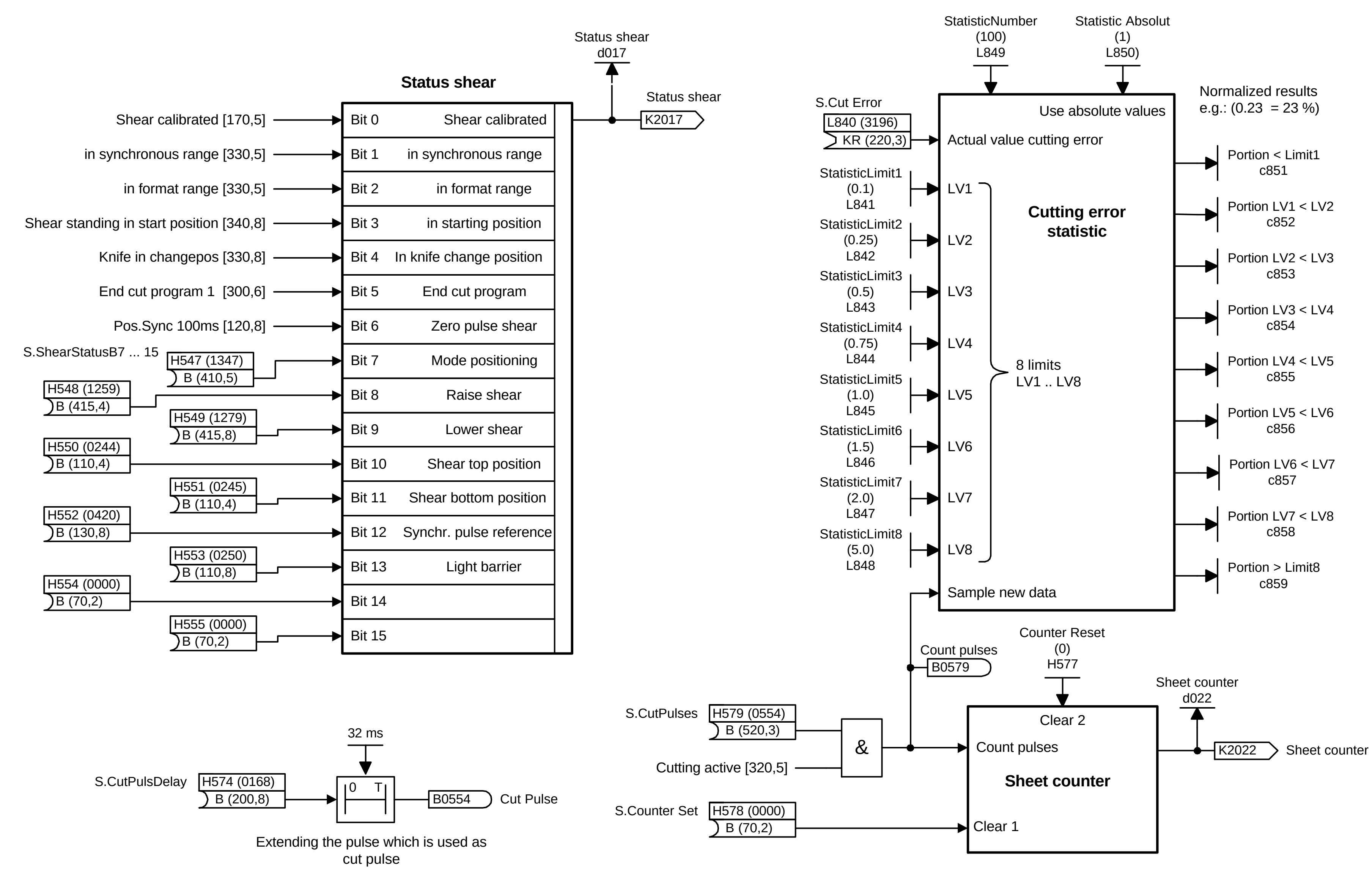
- check pulse encoder parameters
- check pulse encoder simulation board (CU)

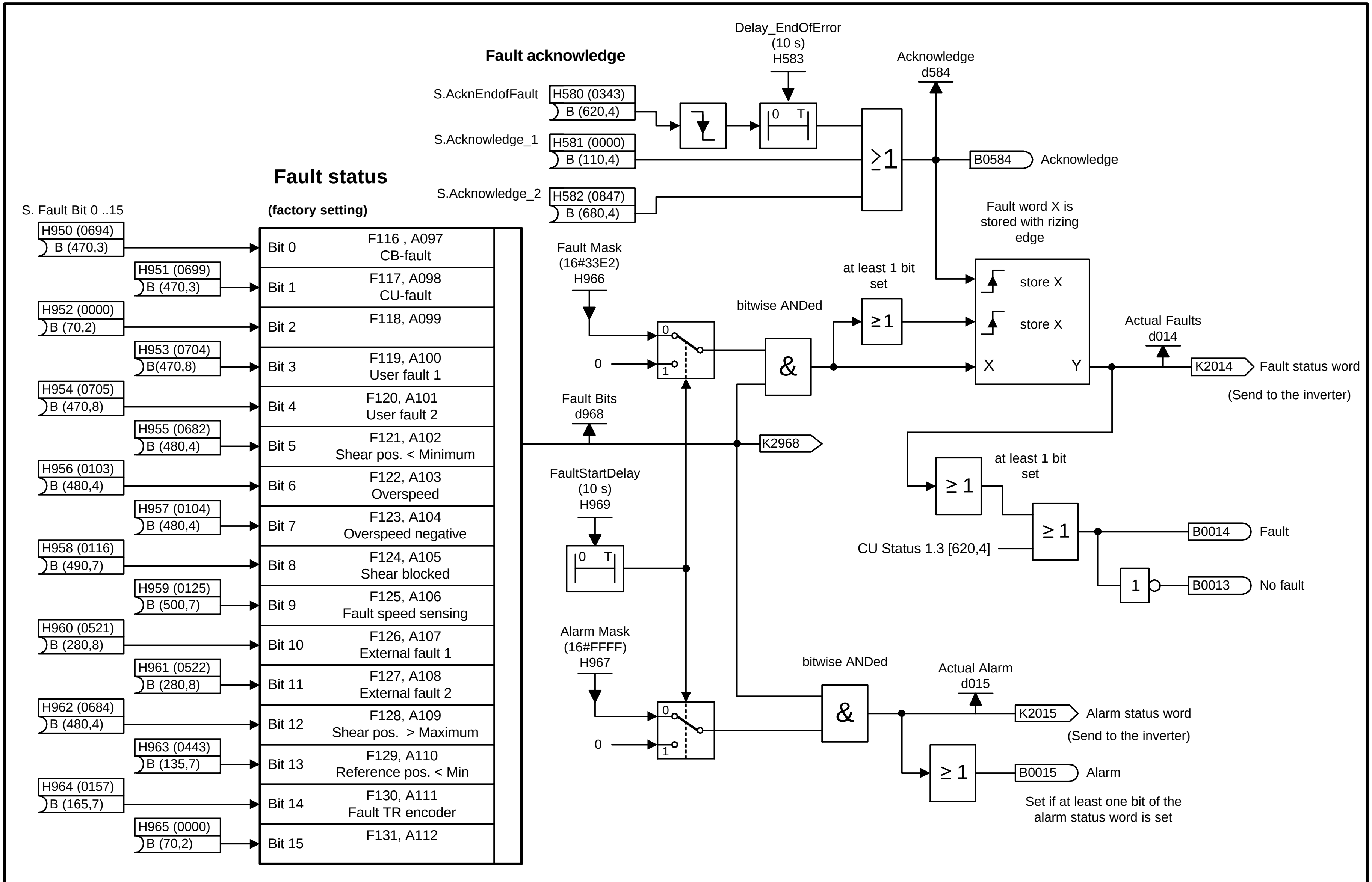



| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Diagnostics | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 500 - |
| Pulse encoder fault detection | | | | | 10.01.01 | Sheet cutter / Cut to Length | |

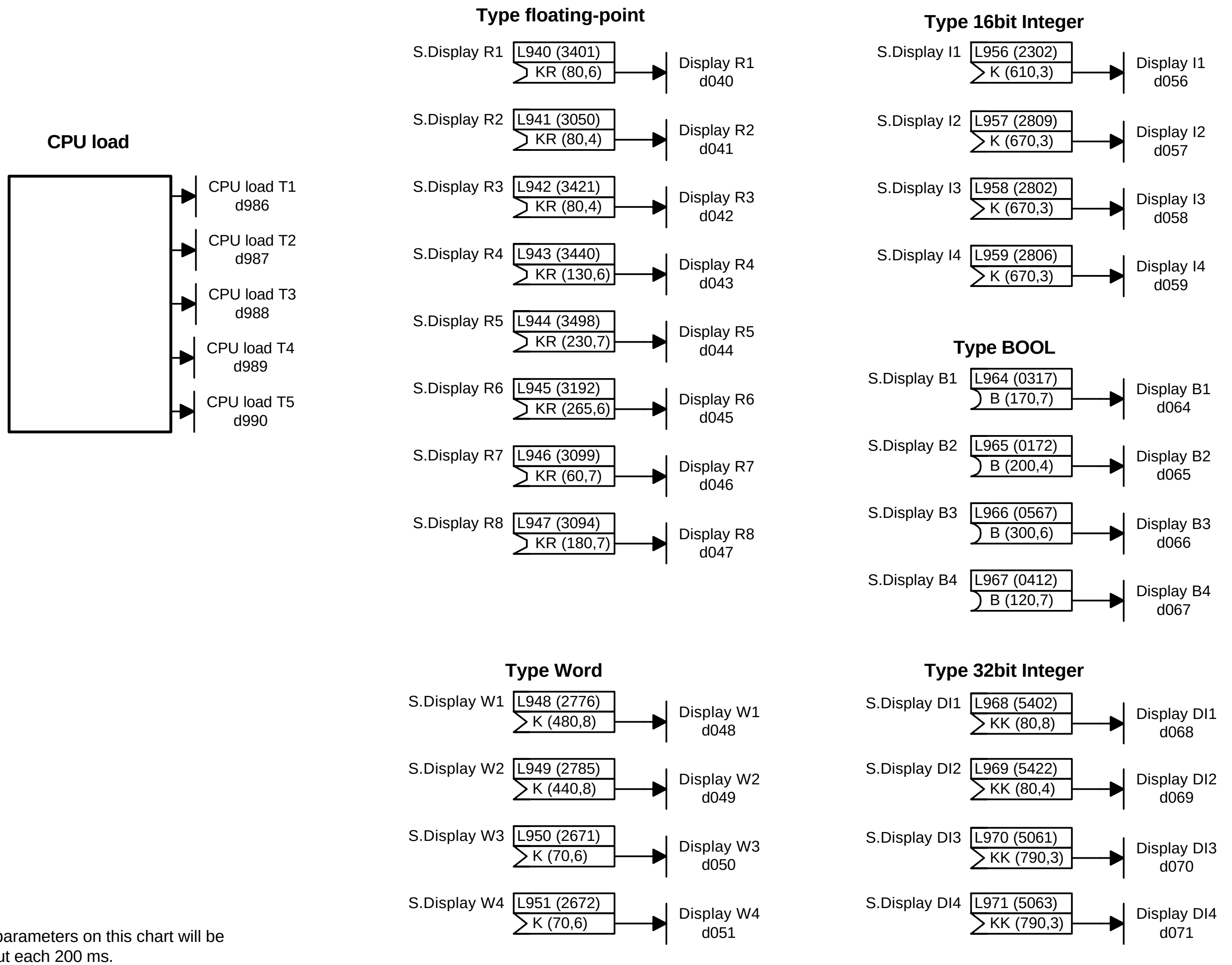



| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Status | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 510 - |
| System status and status control logic | | | | | 10.01.01 | Sheet cutter / Cut to Length | |


Status shear
Status shear
d017
Status shear
K2017
Shear calibrated [170,5]
in synchronous range [330,5]
in format range [330,5]
Shear standing in start position [340,8]
Knife in changepos [330,8]
End cut program 1 [300,6]
Pos.Sync 100ms [120,8]
S.ShearStatusB7 ... 15
H547 (1347)
B (410,5)
H548 (1259)
B (415,4)
H549 (1279)
B (415,8)
H550 (0244)
B (110,4)
H551 (0245)
B (110,4)
H552 (0420)
B (130,8)
H553 (0250)
B (110,8)
H554 (0000)
B (70,2)
H555 (0000)
B (70,2)
Bit 0 Shear calibrated
Bit 1 in synchronous range
Bit 2 in format range
Bit 3 in starting position
Bit 4 In knife change position
Bit 5 End cut program
Bit 6 Zero pulse shear
Bit 7 Mode positioning
Bit 8 Raise shear
Bit 9 Lower shear
Bit 10 Shear top position
Bit 11 Shear bottom position
Bit 12 Synchr. pulse reference
Bit 13 Light barrier
Bit 14
Bit 15
StatisticNumber
(100)
L849
Statistic Absolut
(1)
L850)
S.Cut Error
L840 (3196)
KR (220,3)
Use absolute values
Actual value cutting error
Cutting error statistic
StatisticLimit1
(0.1)
L841
StatisticLimit2
(0.25)
L842
StatisticLimit3
(0.5)
L843
StatisticLimit4
(0.75)
L844
StatisticLimit5
(1.0)
L845
StatisticLimit6
(1.5)
L846
StatisticLimit7
(2.0)
L847
StatisticLimit8
(5.0)
L848
LV1
LV2
LV3
LV4
LV5
LV6
LV7
LV8
8 limits
LV1 .. LV8
Sample new data
Normalized results
e.g.: (0.23 = 23 %)
Portion < Limit1
c851
Portion LV1 < LV2
c852
Portion LV2 < LV3
c853
Portion LV3 < LV4
c854
Portion LV4 < LV5
c855
Portion LV5 < LV6
c856
Portion LV6 < LV7
c857
Portion LV7 < LV8
c858
Portion > Limit8
c859
Count pulses
B0579
Counter Reset
(0)
H577
Sheet counter
d022
S.CutPulses
H579 (0554)
B (520,3)
&
Cutting active [320,5]
Clear 2
Count pulses
Sheet counter
Clear 1
K2022
Sheet counter
S.Counter Set
H578 (0000)
B (70,2)
32 ms
S.CutPulsDelay
H574 (0168)
B (200,8)
0 T
B0554
Cut Pulse
Extending the pulse which is used as cut pulse




| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Status | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 530 - |
| Faults and alarms | | | | | 10.01.01 | Sheet cutter / Cut to Length | |

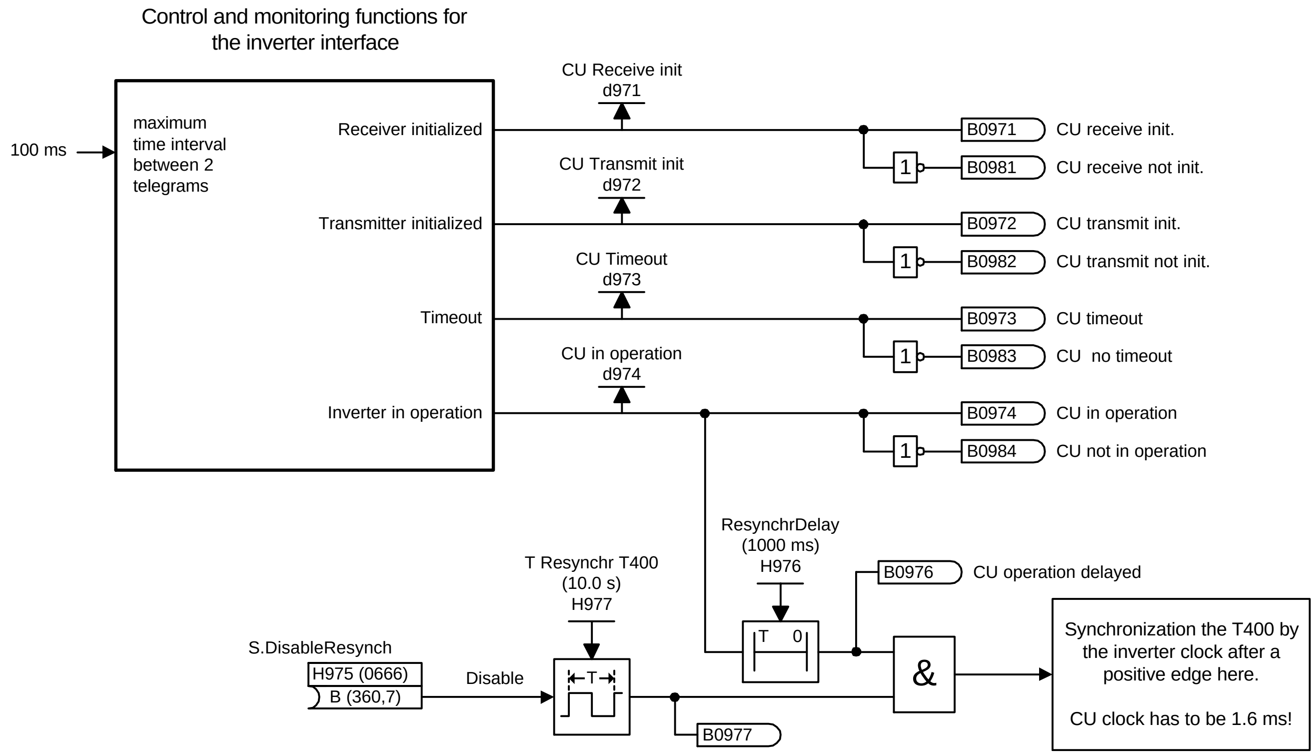



**Note:**

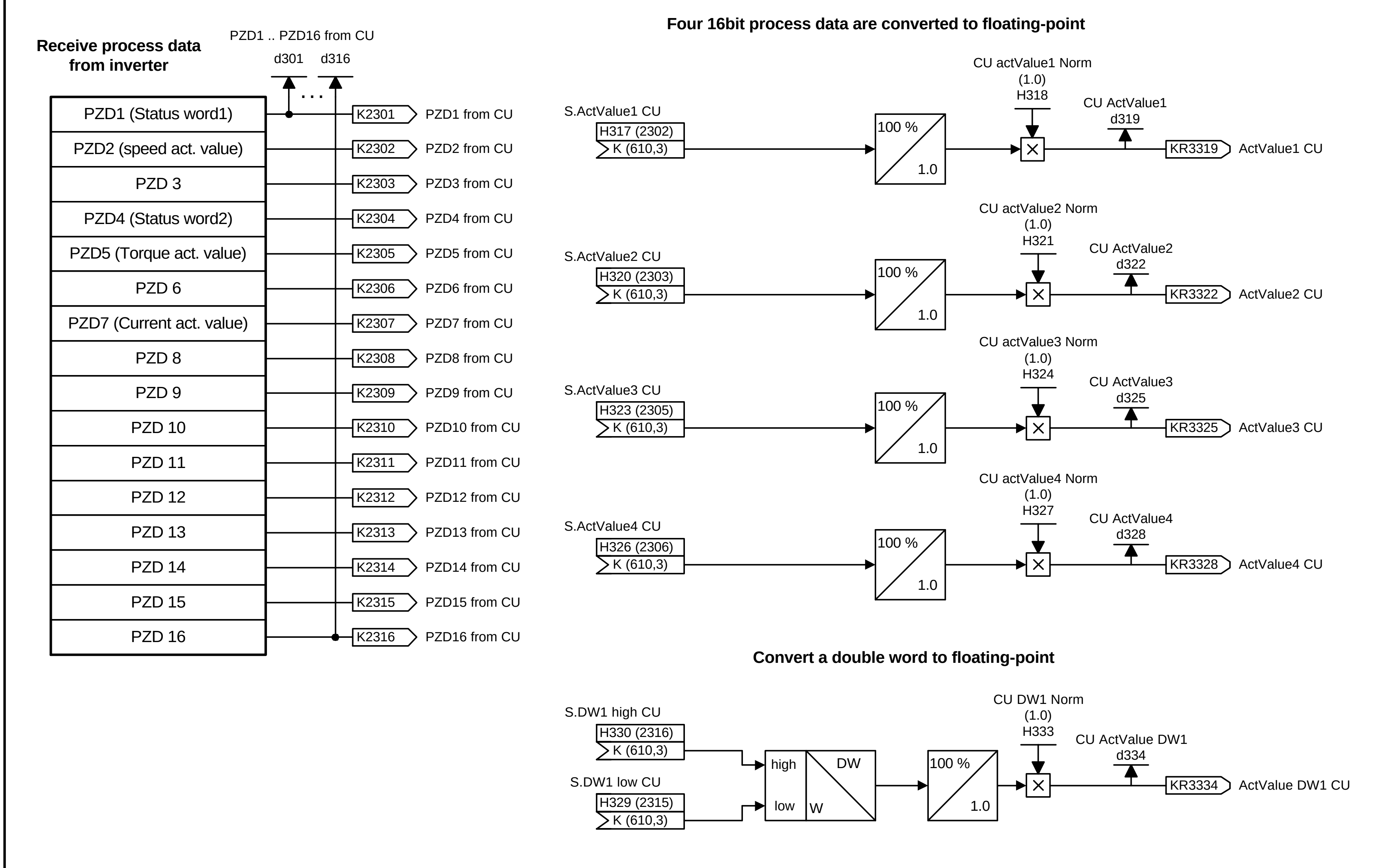
The display parameters on this chart will be updated about each 200 ms.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|

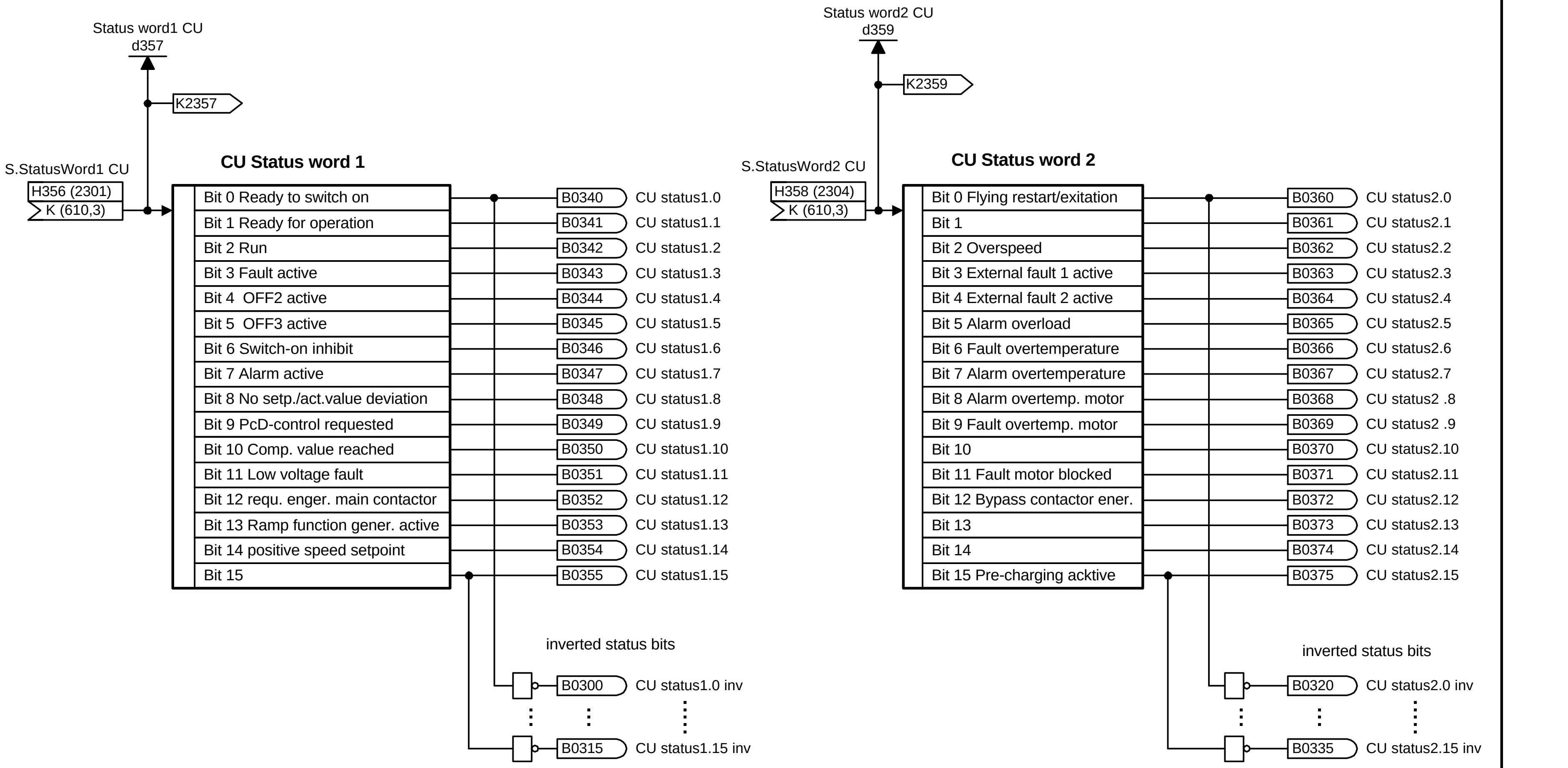
| | | | | |
|---|---|---|---|---|
| Diagnostics | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 540 - |
| Display parameters | | 10.01.01 | Sheet cutter / Cut to Length | |



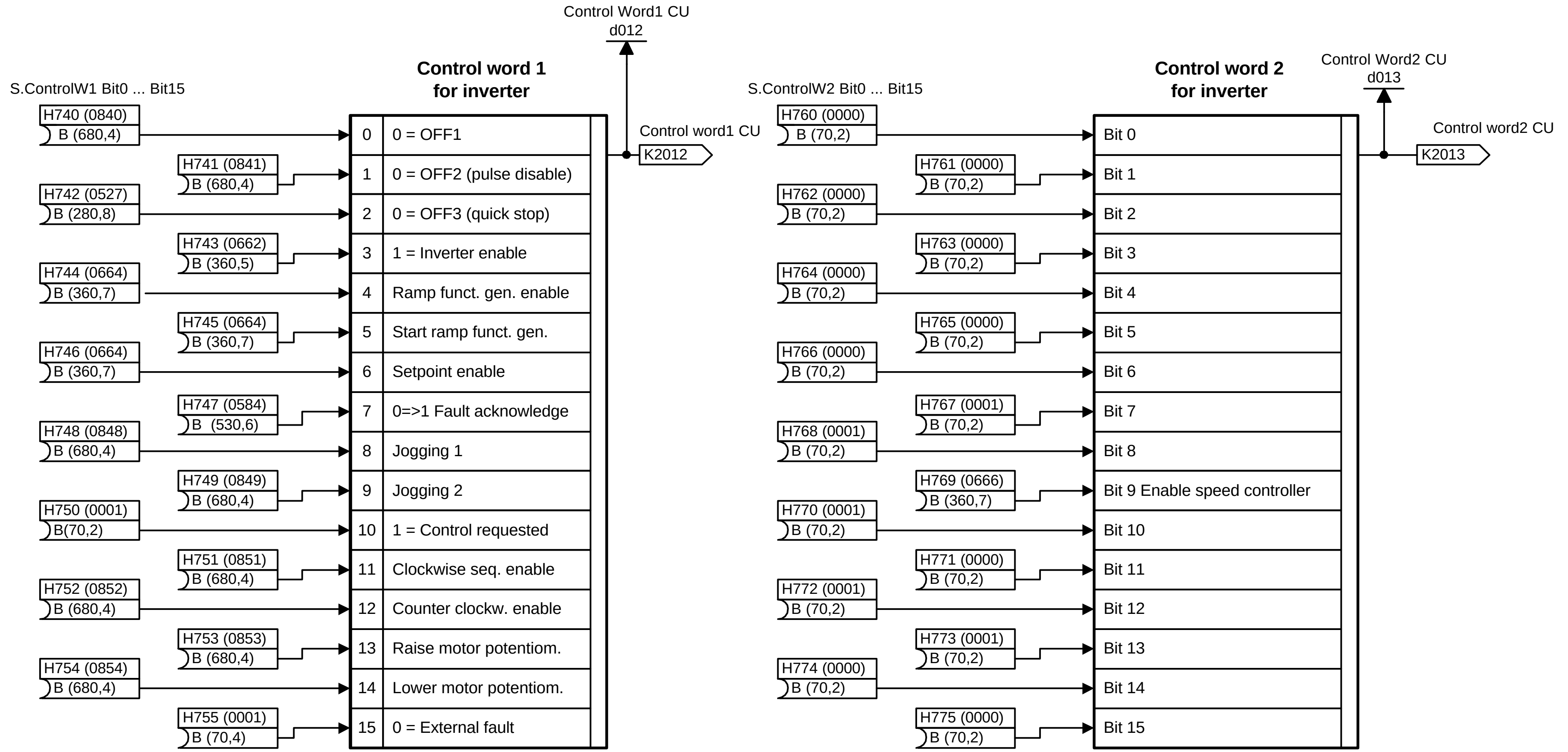

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Inverter interface | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 600 - |
| General settings | | | | | 10.01.01 | Sheet cutter / Cut to Length | |



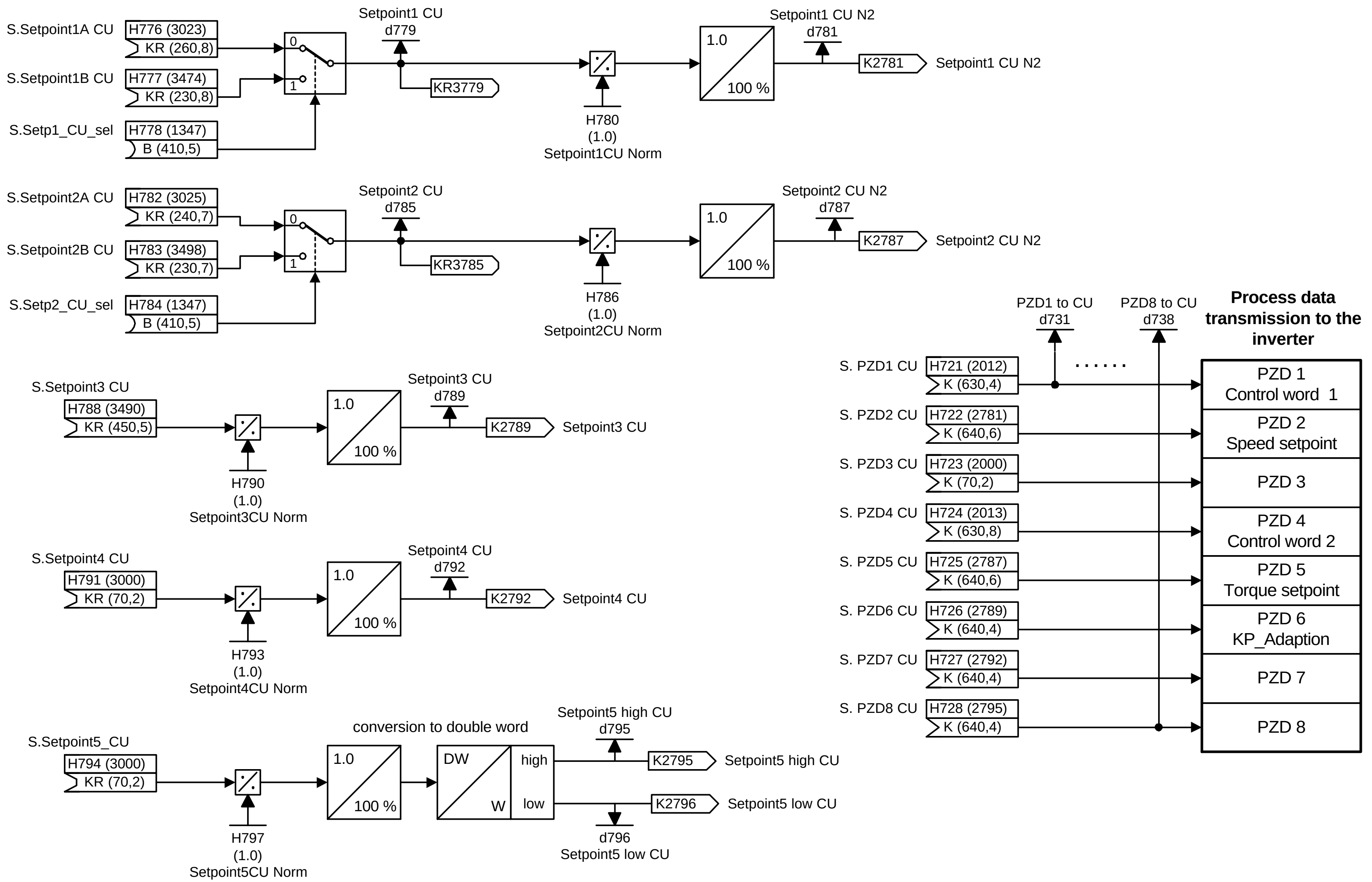

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Inverter interface | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 610 - |
| Process data reception | | | | | 10.01.01 | Sheet cutter / Cut to Length | |



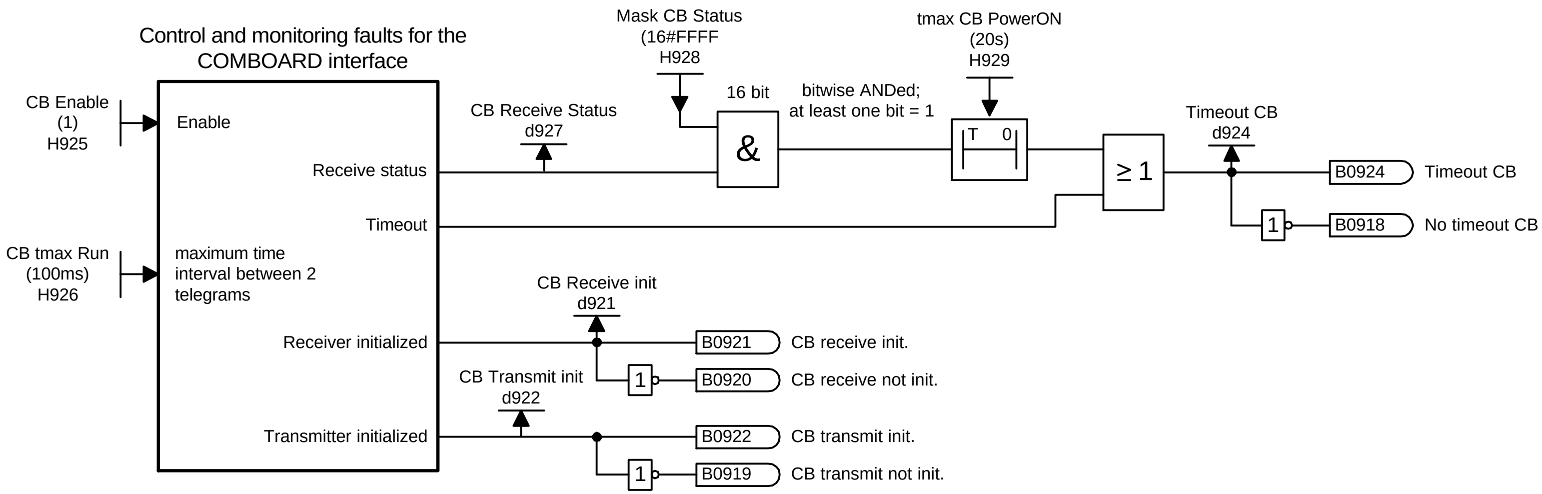

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Inverter interface | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 620 - |
| Inverter status words | | | | | 10.01.01 | Sheet cutter / Cut to Length | |



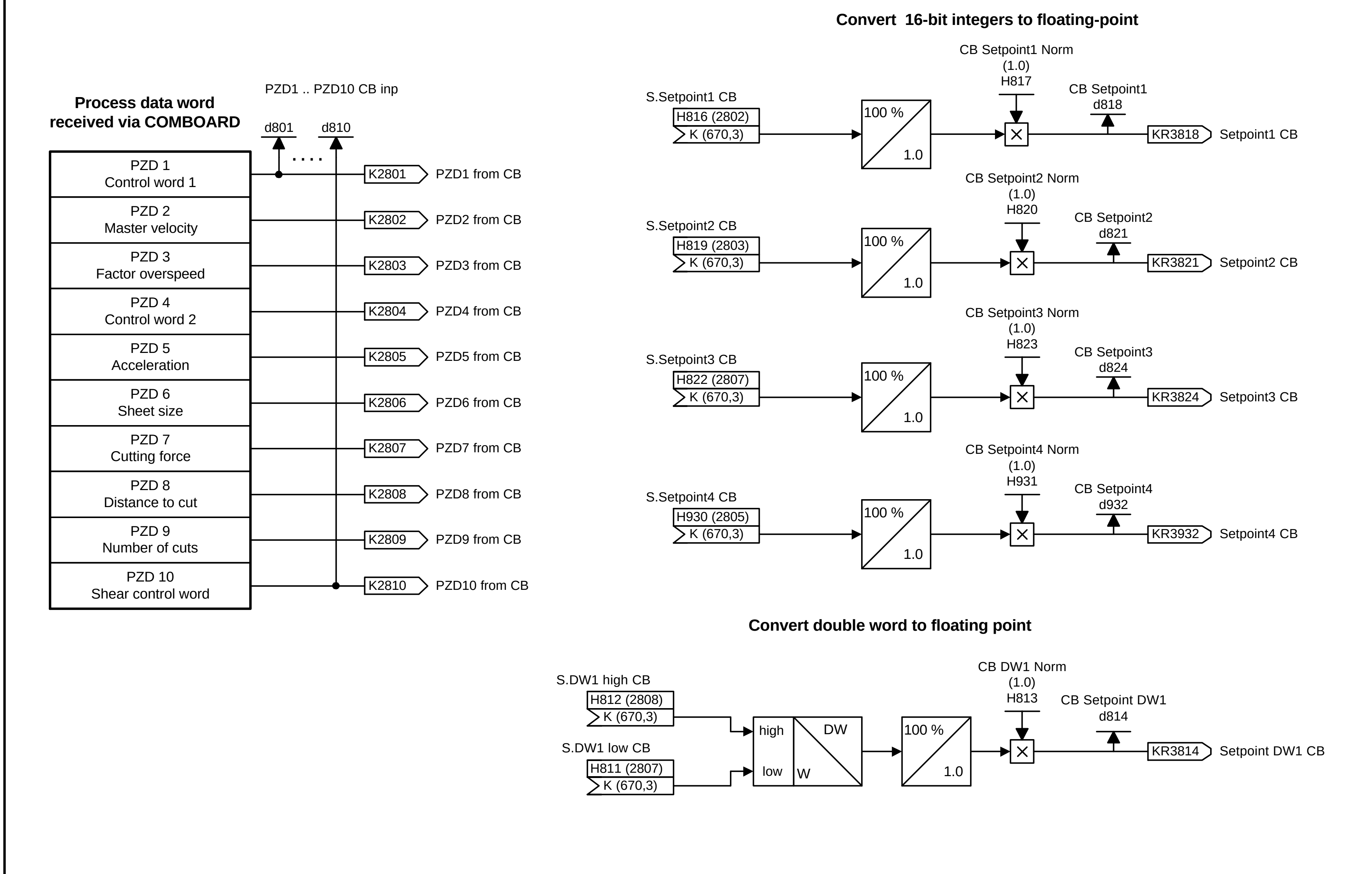

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Inverter interface | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 630 - |
| Control words | | | | | 10.01.01 | Sheet cutter / Cut to Length | |



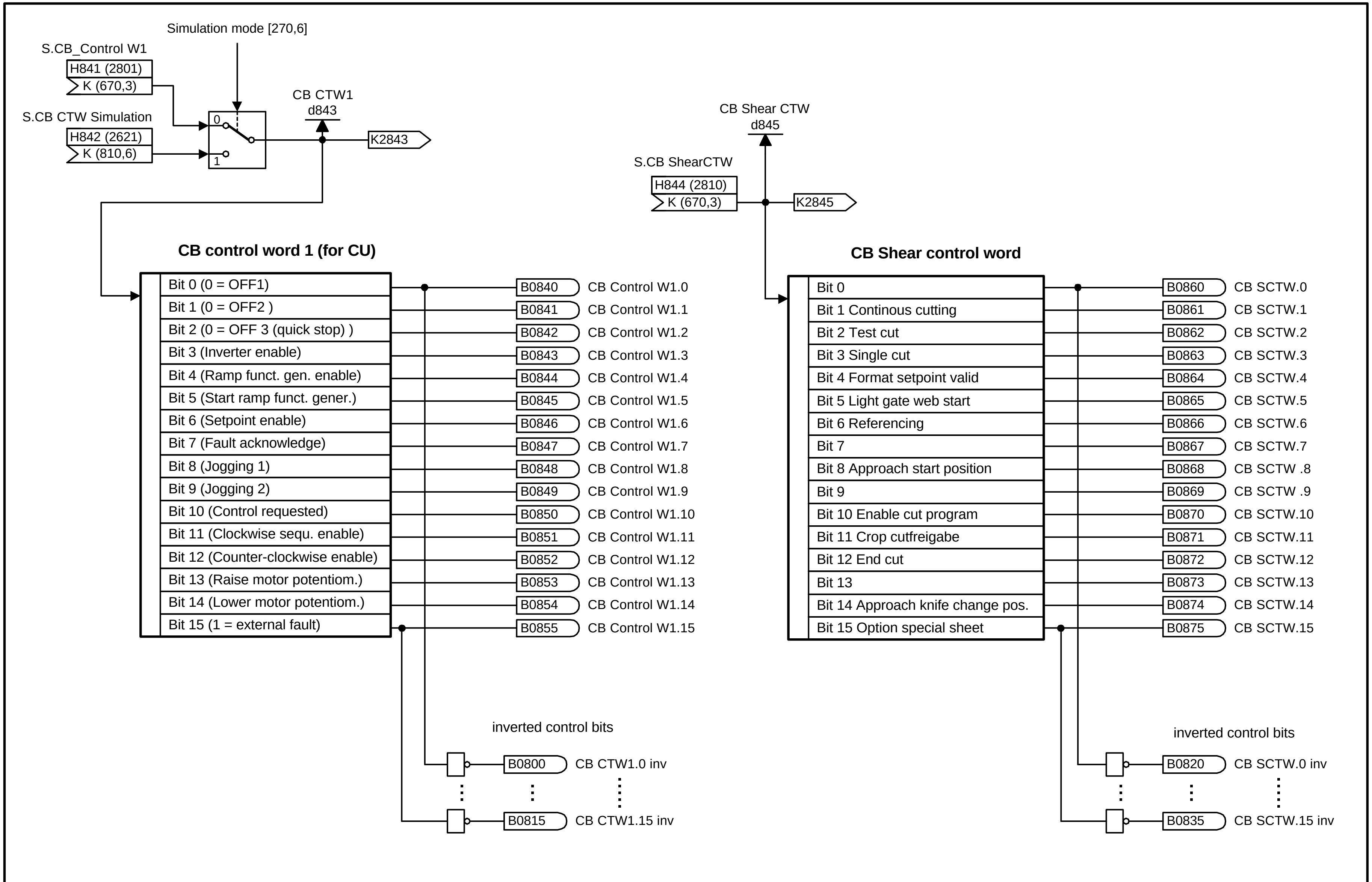

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Inverter interface | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 640 - |
| Process data transmission | | | | | 10.01.01 | Sheet cutter / Cut to Length | |



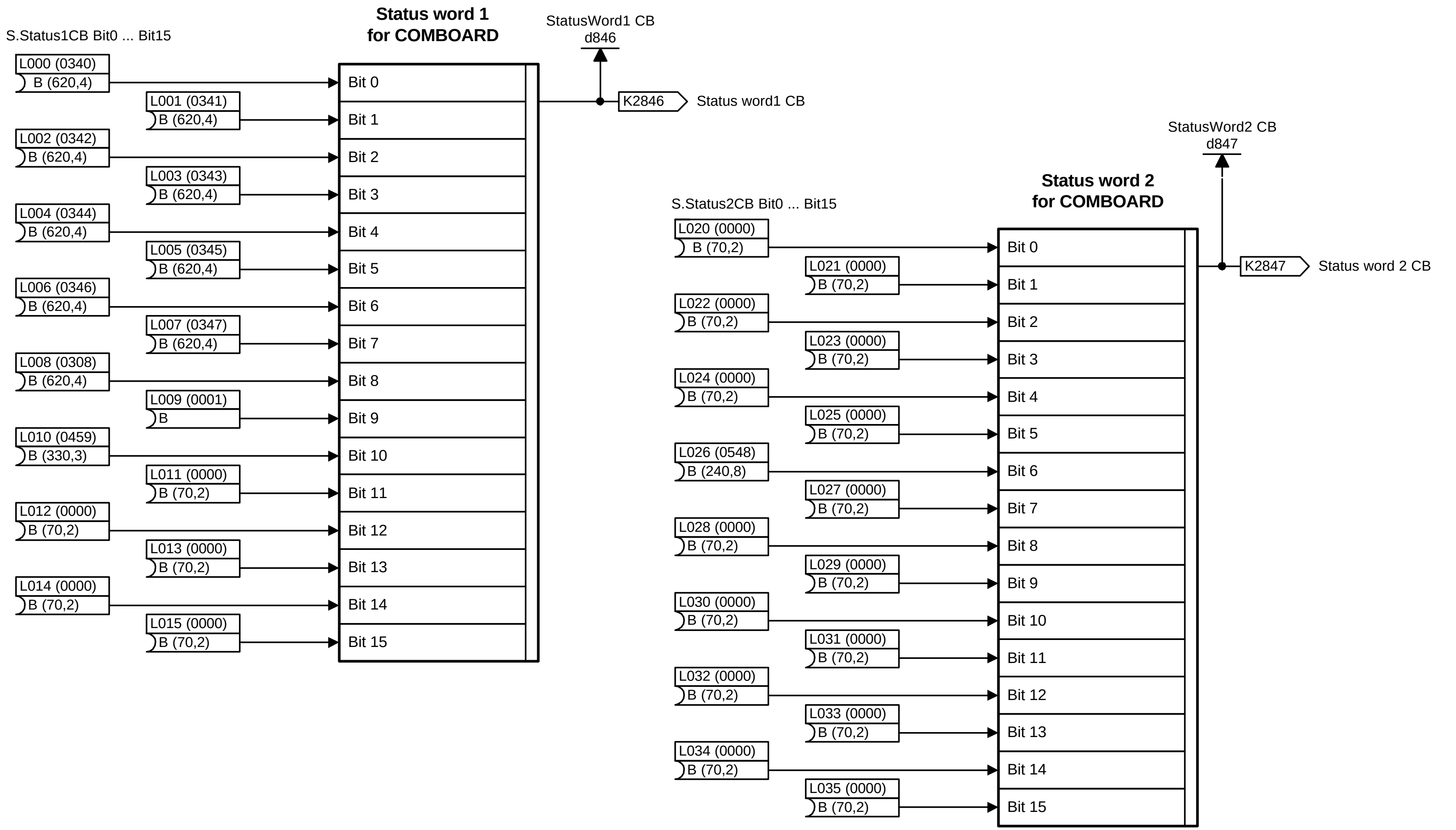

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| COMBOARD | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 660 - |
| General settings | | | | | 10.01.01 | Sheet cutter / Cut to Length | |



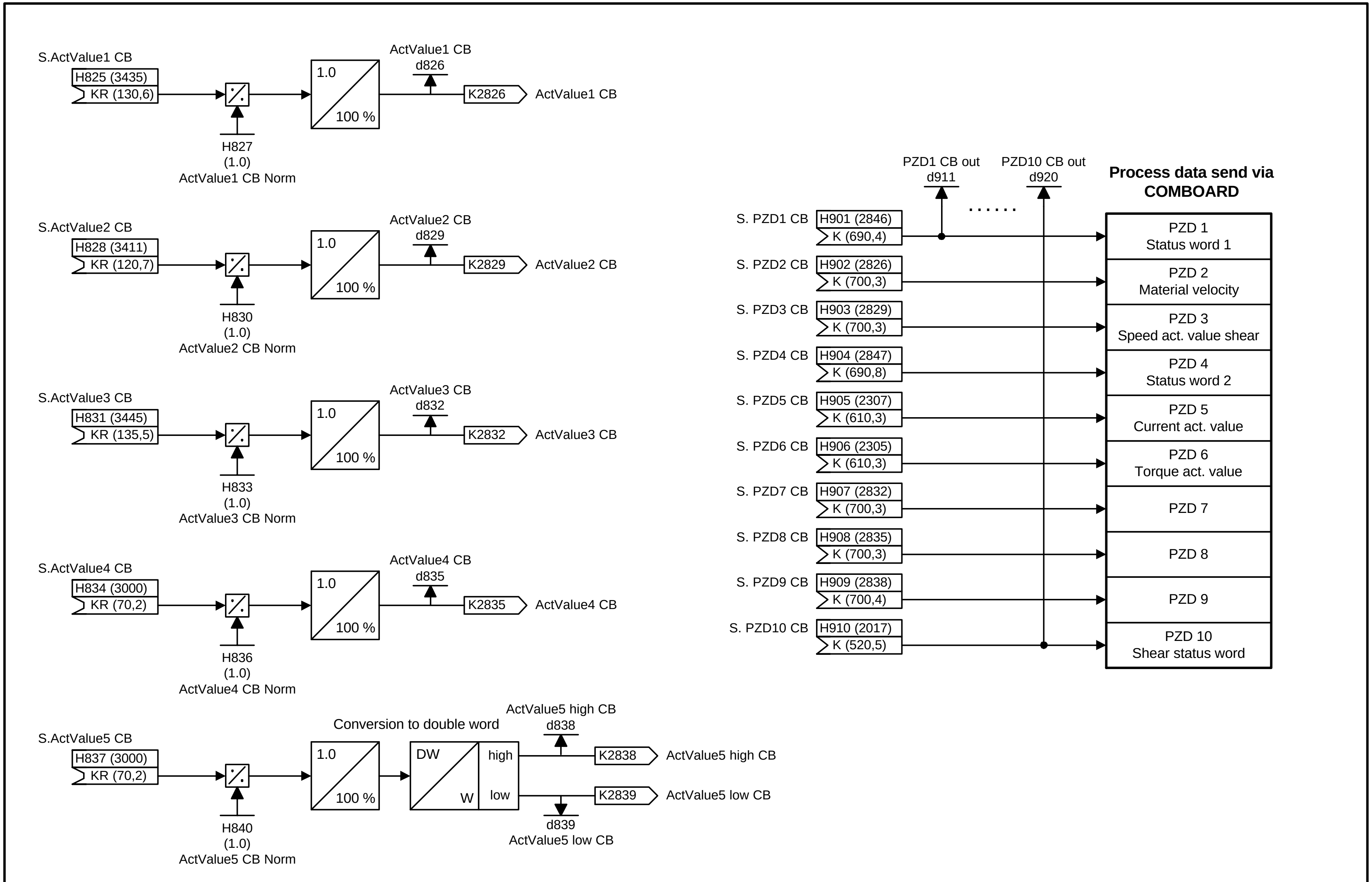

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| COMBOARD | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 670 - |
| Process data reception | | | | | 10.01.01 | Sheet cutter / Cut to Length | |



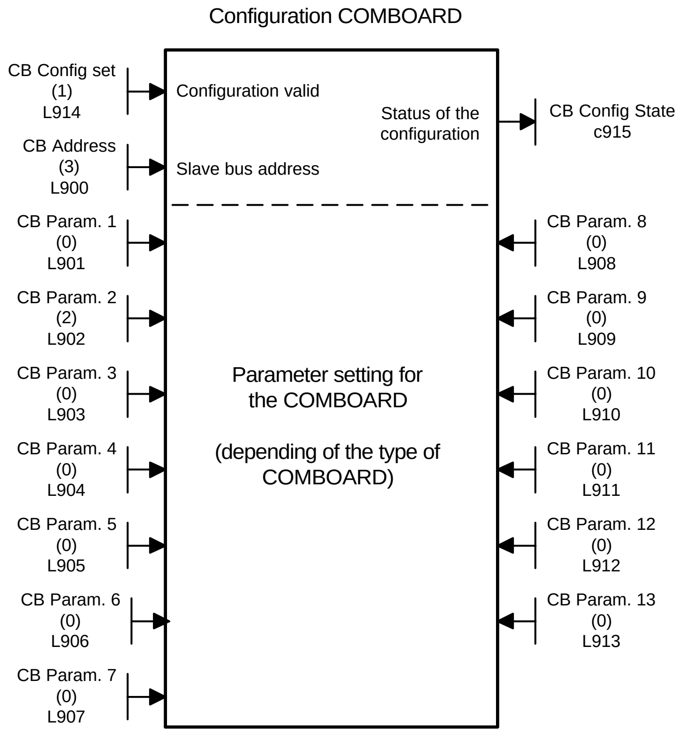

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| COMBOARD | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 680 - |
| Control words | | | | | 10.01.01 | Sheet cutter / Cut to Length | |




| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| COMBOARD | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 690 - |
| Status words | | | | | 10.01.01 | Sheet cutter / Cut to Length | |




| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| COMBOARD | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 700 - |
| Process data transmission | | | | | 10.01.01 | Sheet cutter / Cut to Length | |




<u>Configuration of COMBOARDs:</u>

These parameters are reserved for using COMBOARDs in SRT400 applications.

For the configuration of a COMBOARD placed in slot G (lower position) of the electronic box of inverters use parameters of the inverter (e.g. P918 for the bus address with Masterdrives MC).

The modifications of any parameter L900 to L913 becomes valid after setting

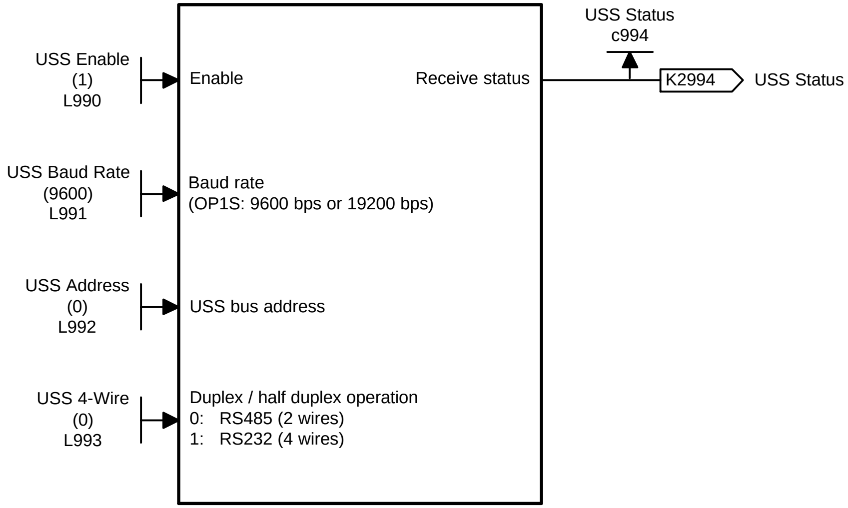
L914= 0 and L914=1.

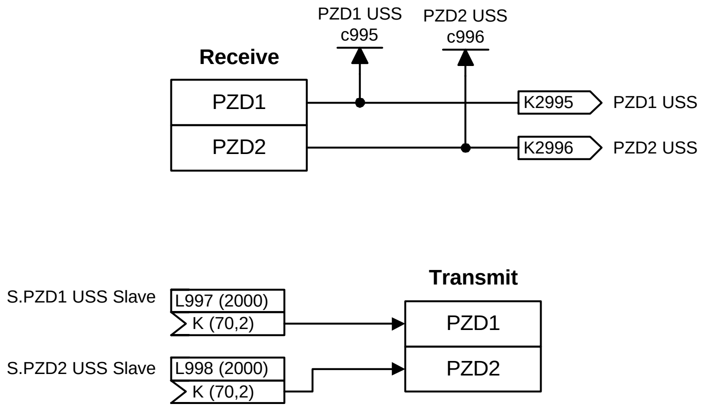
**USS slave operation**

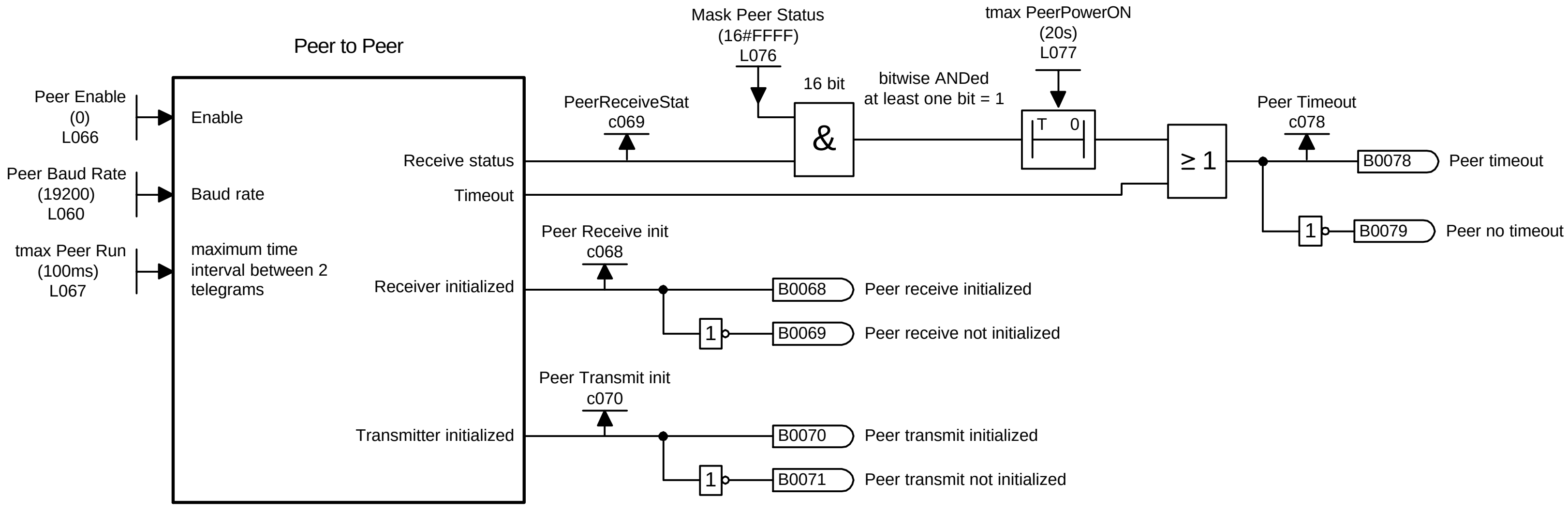
The USS slave coupling is required for visualizing or changing parameters using OP1S or SIMOVIS only if the T400 is working stand alone in the SRT400 rack.

For enabling set T400 switch S1/8 = ON. The switching becomes valid after the next power on. Online communications with other service tools using the same interface (e.g. CFC) will be disabled!

If there is no access with OP1S caused by not supported parameter setting (e.g. wrong baud rate) set S1/8 = OFF and use the Service-IBS program to correct the parameters.



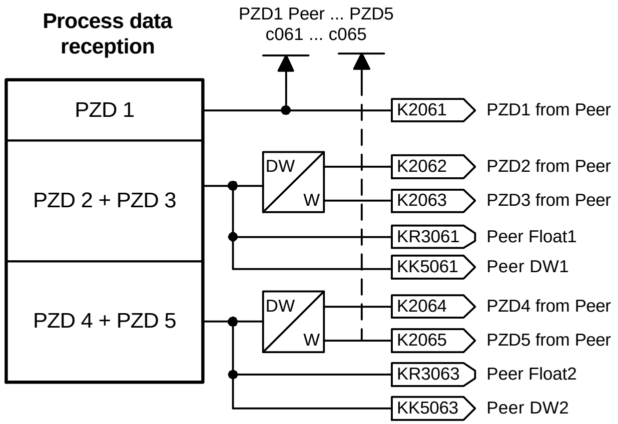


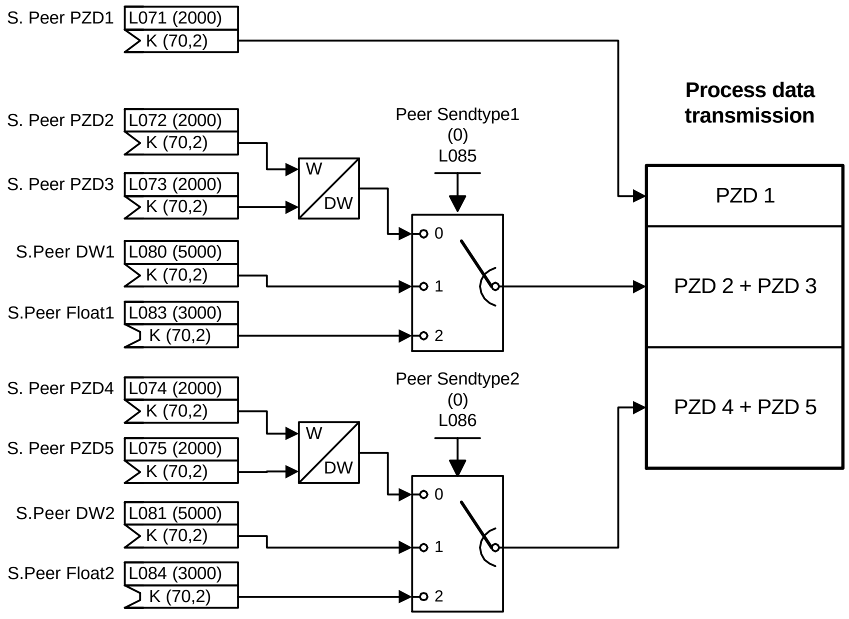

**NOTE:**
After enable the Peer to Peer interface the T400 board has to been restarted (power off - power on).

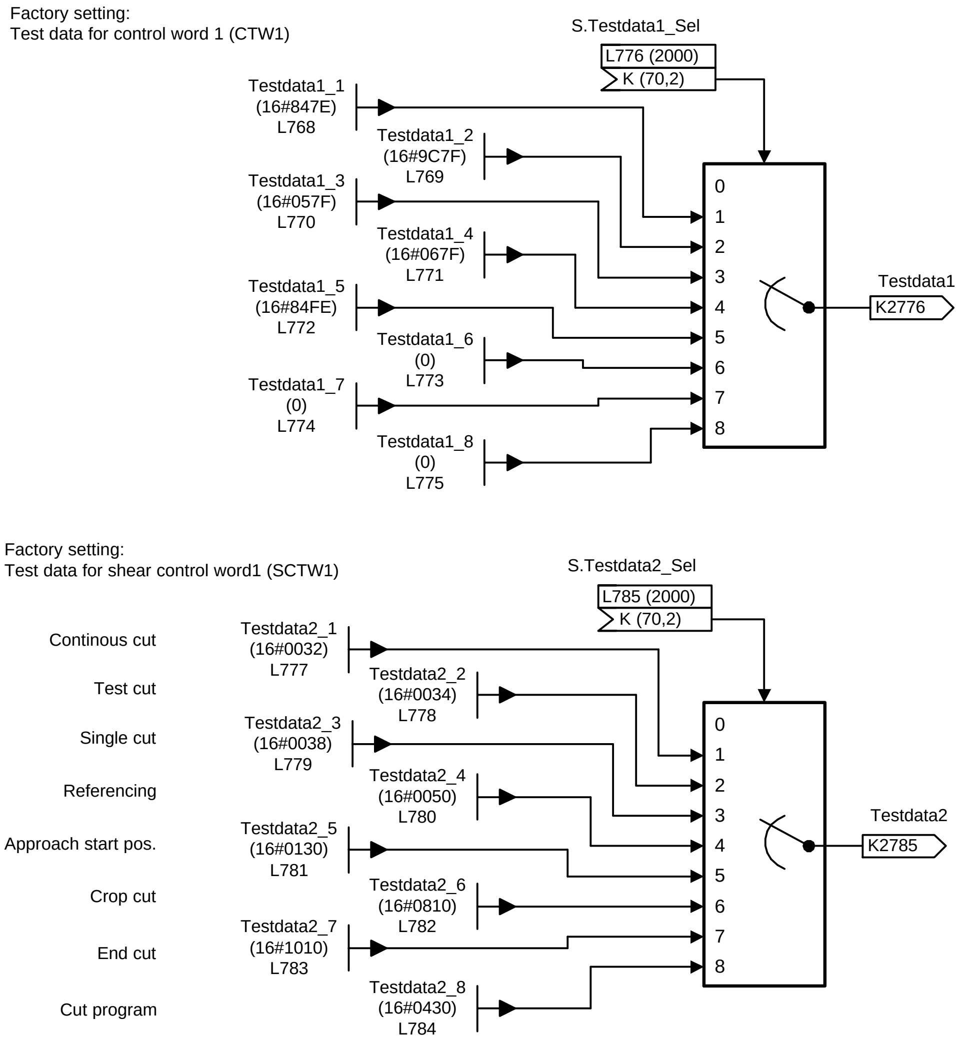
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|

Process data words PZD2, PZD3 und PZD4, PZD5 may be transmitted either as word, double word or floating-point values.

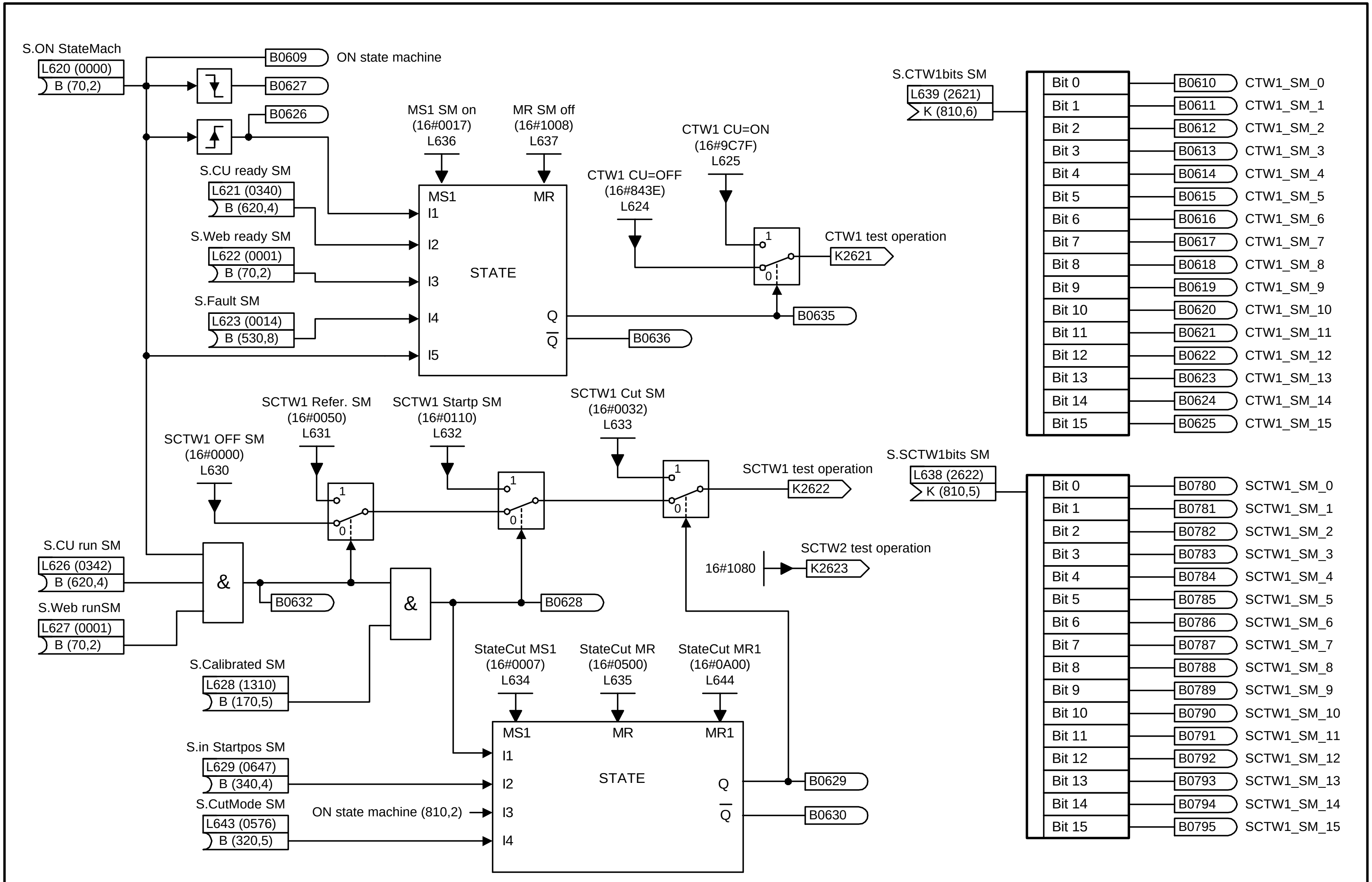
Note:
Before connecting F**loating-point** receiver channels (e.g. KR3061) to other function blocks make sure that you receive floating-point data from this channel! This avoids additional computation time for the error handling of "not-a-number" values.






| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|
| Test operation | | | | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 800 - |
| Multiplexer selected fixed values | | | | | 10.01.01 | Sheet cutter / Cut to Length | |




| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| Test operation | V1.02 | FPlan_SPS450e.vsd | Function diagram | - 810 - |
| Startup state machine | | 10.01.01 | Sheet cutter / Cut to Length | |