**Project: MSS60**

**module:fill controller**

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# Fill controller

The filling controller ensures the stationary comparison of the actual filling to the target filling. The fill controller is a PI controller, wherein the I-part is switched off (current value is frozen), if the throttle valve is open so that the motor is no longer throttled, or if the deviation of the current throttle position from the setpoint specification for the position controller is greater than an applicationable constant. The P-share is set to zero when the condition B\_WDK\_KEINE\_DROSSEL active.

The controller influences the control md\_rf\_soll md\_rf\_soll multiplicative.

The slider is supported by a prediction of the filling expected in the next step.

## Calculation of the rule difference

The controller deviation is calculated as follows:

fr\_rf\_delta = 10 \* rf - md\_rf\_roh

A factor of 10 results from different standardization.

## Predictor

The predictor coefficient is calculated as follows:

fr\_rf\_prae = kls\_wint(&KL\_FR\_PRAE, n) \* (md\_rf\_roh - md\_rf\_roh-1)

The controller setpoint is influenced by the predictor coefficient. .

fr\_rf\_delta = fr\_rf\_delta + fr\_rf\_prae

## PI -- Controller

The fill controller is a PI controller, where the P-share is set to zero when the motor is no longer throttled. The I portion is set to zero if B\_ML is not set or if the error is B\_HFM\_.

The I-part is frozen when the motor is no longer throttled and the actual filling is smaller than the target fill. In addition, the I portion is frozen if the deviation of the current throttle position from the setpoint specification for the position controller is greater than an applicationable constant.

## Data of the fill controller

Description of the variables:

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Description** | **Type** | **Resolution** |
| fr\_rf\_delta | Controller deviation | Sw | 1/10 000 |
| Rf | relative filling is | Uw | 1/1000 |
| md\_rf\_roh | relative filling, not p/t corr. | Uw | 1/10000 |
| fr\_rf\_gradient | Change of rel. Filling | Uw | 1/10000 / 10 ms |
| md\_rf\_soll | p/t corr. Rel. Filling should be | Uw | 1/10000 |
| lls\_eml.rf\_rel\_korr | p/t corr. Rel. Filling output | Uw | 1/10000 |
| fr\_reg\_i | I-part of the fill controller | Sw | 1/32768 |
| fr\_ant\_i | P-part of the fill controller | Sw | 1/32768 |
| fr\_reg\_p |  |  |  |
| fr\_regler |  |  |  |
| fr\_rf\_prae |  |  |  |
| fr\_rf\_roh\_pre |  |  |  |

Description of the application data:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name** | **Type** | **Dim.** | **X** | **Y axis** |
| KL\_FR\_IPOS | Kl | 8 x 6 | rf controller deviation | n\_mot |
| KL\_FR\_INEG | Kl | 8 x 6 | rf controller deviation | n\_mot |
| KL\_FR\_IPOS | Kl | 8 x 6 | rf controller deviation | n\_mot |
| KL\_FR\_P | Kl |  |  |  |
| KL\_FR\_PRAE | Kl |  |  |  |
| K\_FR\_ADAPT\_TOL |  |  |  |  |
| K\_FR\_DI\_ENTDR |  |  |  |  |
| K\_FR\_DMLADAPT\_MAX |  |  |  |  |
| K\_FR\_EDK\_DIFF |  |  |  |  |
| K\_FR\_IMAX |  |  |  |  |
| K\_FR\_IMIN |  |  |  |  |
| K\_FR\_MLADAPT\_MAX |  |  |  |  |
| K\_FR\_MLADAPT\_MIN |  |  |  |  |
| K\_FR\_MLADAPT\_OFFSET |  |  |  |  |
| K\_FR\_TAU\_ADAPT |  |  |  |  |
| K\_FR\_TMOT\_ADAPT |  |  |  |  |
| K\_FR\_T\_ADAPT |  |  |  |  |

## Circuit diagram of the fill controller

