Project: MSS54

Module:Filling controller

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1 filling regulator

The filling controller ensures the steady-state adjustment of the actual filling to the target filling. The filling controller is a PI controller, whereby the I component is switched off (current value is frozen) when the throttle valve is open enough that the engine is no longer throttled, or when the deviation of the current throttle valve position from the target value for the position controller is greater than an applicable constant. The P component is set to zero when the condition B_WDK_KEINE_THROTTLE is active.

The controller influences the manipulated variable md_rf_soll multiplicatively.

The controller is supported by a prediction of the filling to be expected in the next step.

1.1 Calculation of the control difference

The controller deviation is calculated as follows:

fr_rf_delta = 10 * rf - md_rf_raw

The factor 10 results from different standardization.

1.2 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

1.3 PI -- Controller

The filling controller is a PI controller, whereby the P component is set to zero when the motor is no longer throttled. The I component is set to zero if B_ML is not set or if B_HFM_ERROR occurs.

The I component is frozen when the engine is no longer throttled and the actual filling is less than the target filling. In addition, the I component is frozen if the deviation of the current throttle valve position from the target value for the position controller is greater than an applicable constant.

1.4 Data of the filling regulator

Description of the variables:

Name	Description	Type	Resolution
fr_rf_delta rf	Controller deviation	bw 1/1	0 000
	relative filling is	uw 1/1	000
md_rf_roh	relative filling target, not p/t corrected	uw 1/1	0000
fr_rf_gradient	change in the rel. filling	uw 1/1	0000 / 10 ms
md_rf_soll	p/t corr. rel. filling target p/	uw 1/1	0000
lls_eml.rf_rel_korr	t corr. rel. filling output I-	uw 1/1	0000
fr_reg_i	component of the filling	sw 1/3	2768
fr_ant_i	controller P-component of the filling controller	sw 1/3	2768
fr_reg_p			
fr_regler			
fr_rf_prae			
fr_rf_roh_pre			

Description of the application data:

name	type	Dim. x-axis		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				

1.5 Circuit diagram of the filling regulator

filling controller/density correction

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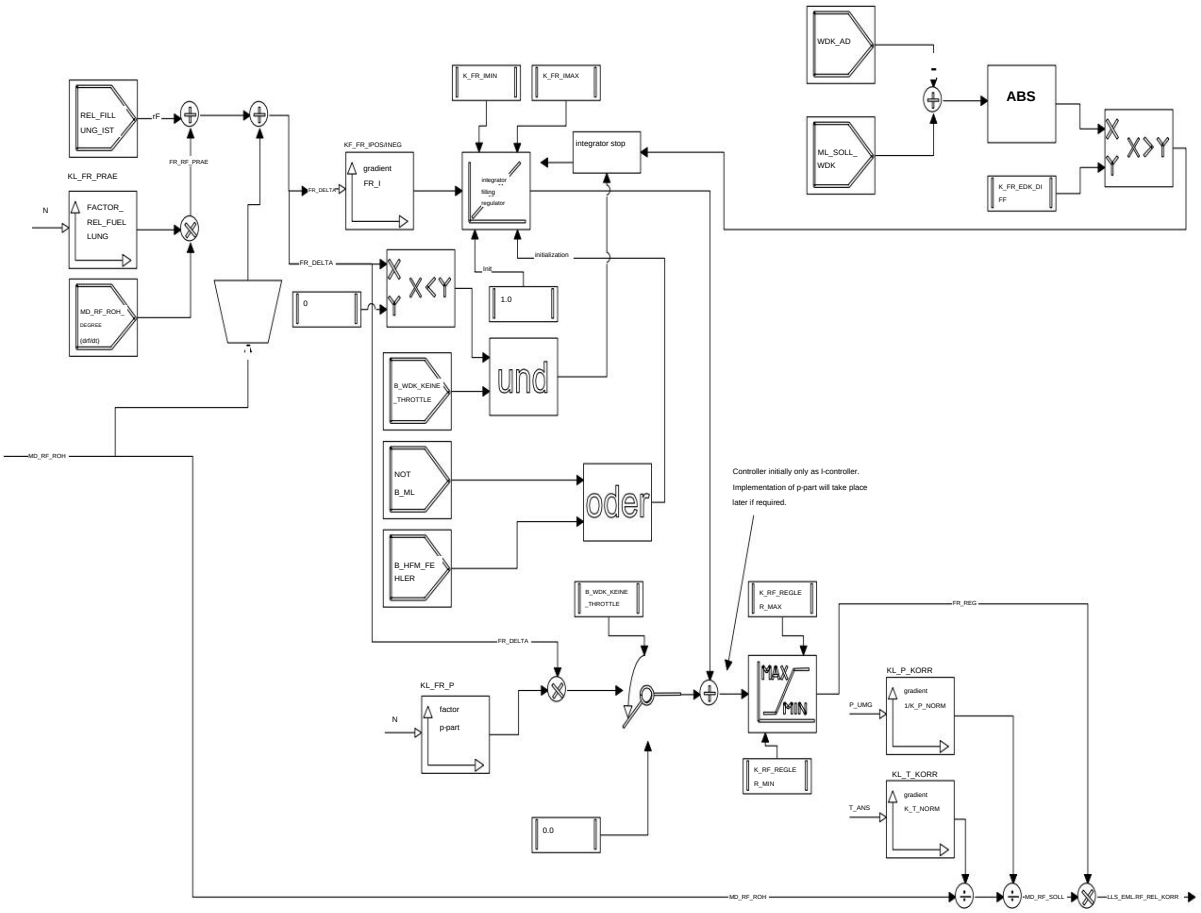

	Department	Date	name	Filename
Editor ZS-M-57	05.07.2005		.Frank	FR.DOC