FB MDBAS 8.30 (Calculation of the Basic Parameters for the Torque Interface)

MDBAS 8.30 Function Description

See the *funktionsrahmen* for the following diagrams:

MDBAS MDBAS (included in this translation)
MDBAS ZW NWS

The optimum torque values mioptl1_w at lambda = 1 are calculated with the help of the map KFMIOP. This torque is corrected for the influence of lambda by multiplying by the lambda efficiency (etalab). The lambda efficiency is obtained from the characteristic line ETALAM. Multiplying by the ignition angle efficiency gives the basic torque mibas. This corresponds to the indicated torque that is set when the combustion takes place with the basic lambda (lambas) and the base ignition angle (zwbas).

The optimum ignition angle at lambda = 1 is determined from the map KFZWOP. The sub-function ZW_NWS describes the influence on the optimum ignition angle of an existing camshaft timing adjustment. The equipment options are none, binary (on or off), or continuously variable camshaft timing adjustment. In the case of binary adjustment, the factor fnwue governs continuous switching between the maps KFZWOP and KFZWOP2. In the case of continuous camshaft timing adjustment which depends on the camshaft overlap angle (wnwue) an ignition angle correction is added to KFZWOP. The determined optimum ignition angle (zwoptl1) again applies for lambda = 1. The currently applicable camshaft timing adjustment type is defined by the system constant SY_NWS in SW generation:

SY_NWS = 0: no camshaft timing adjustment
SY_NWS = 1: binary camshaft timing adjustment
SY_NWS = 2: continuously variable camshaft timing adjustment
SY_NWS > 2: not defined.

The software is translated conditionally, i.e. there is only one variant in the EPROM. SY_NWS is not in the EPROM and can not be applied.

Additive corrections depending on lambda, the exhaust gas recirculation rate and engine temperature are included. The resulting ignition angle (zwopt) now forms the basis for the ignition angle efficiency calculation. The basic ignition angle efficiency is calculated using the characteristic ETADZW, the input value is obtained from the difference between zwopt and zwbas. This is followed by an averaging of the basic efficiencies across all cylinders and the result is the base efficiency etazwbm.

The ignition angle correction for exhaust gas recirculation operation can through the code word CWMDBAS either always be included or only included if B_agr = true. In the case of permanent inclusion, ignition angle jumps are avoided by switching off B_agr.

MDBAS 8.30 Application Notes

Exhaust gas recirculation should be inactive throughout all these measurements! Data input requires the following measurements to be made:

1. Operation at Lambda = 1:
Ignition angle fine tuning on an engine dynamometer at lambda = 1 with the engine at normal operating temperature at the following operating points:

Engine speed = 500, 750, 1000, 1250, 1500, 2000, 2500, 3000, 3500, 4000, 4500, 5000, 5500, 6000 & 6500 rpm (if possible)
Relative cylinder charge = 10, 20, 30, 40, 50, 60, 70, 80, 90 and 100%

Ignition angle fine turning begins at the ignition angle at which maximum torque is achieved (i.e. maximum brake torque, MBT) if not to drive at the knock limit. The ignition angle should now be retarded in steps of 4.5° crank angle until the latest mobile firing angle is achieved. The following data must be recorded at each point: engine speed (nmot), relative cylinder charge (rl), lambda, clutch torque and ignition angle.

2. Lambda Dependence
Ignition angle fine tuning through lambda at the following measuring points:

Engine speed = 1000, 2000, & 3000 rpm
Relative cylinder charge = 30, 50 & 70 %

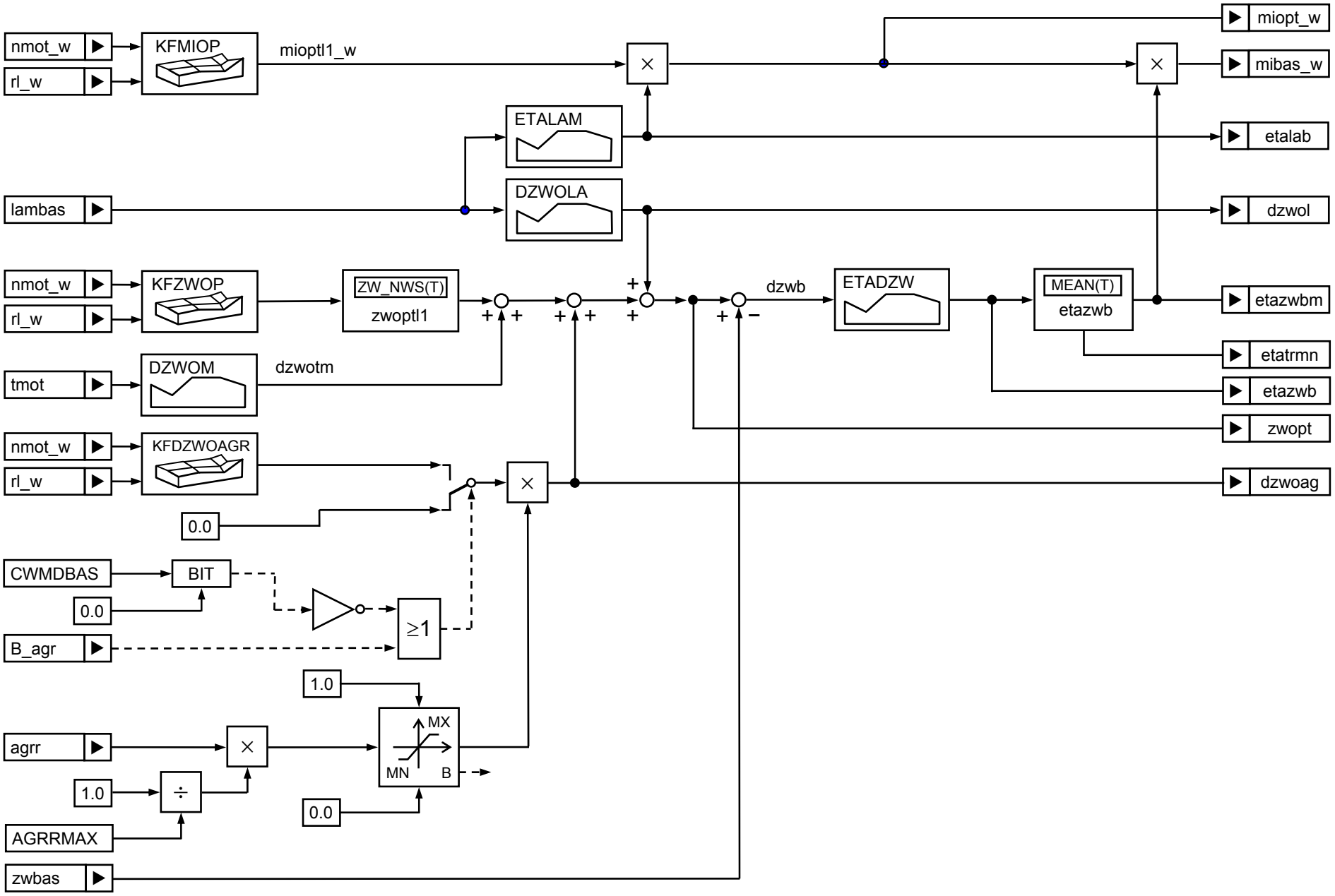
Lambda = 0.80, 0.85, 0.90, 0.95, 1.00, 1.05, 1.10, 1.15 & 1.20

Measurements as above.

3. Drag Torque
The drag torque (engine braking) must be obtained at all the measuring points specified in 1. Measure on an engine dynamometer with no ignition and with the engine at its normal operating temperature.

4. Evaluation
Evaluation of the results takes place at K3/ESY4-Hes.

Parameter	**Description**
AGRRMAX	Maximum possible exhaust gas recirculation rate
CWMDBAS	Codeword to take account of the ignition angle correction for exhaust gas recirculation operation
DZWNWSUE	Delta ignition angle depending on camshaft angle
DZWOLA	Lambda dependence of the optimum ignition angle relative to lambda = 1
DZWOM	Temperature dependent offset of the optimum ignition angle
ETADZW	Ignition angle efficiency dependence on delta ignition angle
ETALAM	Lambda efficiency
KFDZWOAGR	Offset of the optimum ignition angle with exhaust gas recirculation operation
KFMIOP	Optimum engine torque map
KFZWOP	Optimum ignition angle
KFZWOP2	Optimum ignition angle variant 2
Variable	**Description**
AGRR	Exhaust gas recirculation rate
B_AGR	Exhaust gas recirculation one condition
DZWOAG	Exhaust gas recirculation rate dependent ignition angle correction of the optimum ignition angle
DZWOL	Lambda dependent ignition angle correction of the optimum ignition angle
DZWOTM	Temperature dependent ignition angle correction of the optimum ignition angle
ETALAB	Lambda efficiency without intervention based on optimum torque at lambda
ETATRMN	Minimum value of the cylinder barrel efficiency
ETAZWB	Ignition angle efficiency of the basic ignition angles
ETAZWBM	Mean ignition angle efficiency of the basic ignition angles
FNWUE	Weighting factor for inlet camshaft overlap
LAMBAS	Basic lambda
MIBAS_W	Indicated basic torque
MIOPTL1_W	Optimum indicated torque at lambda = 1
MIOPT_W	Optimum indicated torque
NMOT W	Engine speed
RL_W	Relative cylinder charge (word)
R_SYN	Synchro-raster
SY_NWS	System constant for camshaft control: none, binary (on/off) or continuous
TMOT	Engine (coolant) temperature
WNWUE	Camshaft overlap angle
ZWBAS	Basic ignition angle
ZWOPT	Optimum ignition angle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