

Function Sheet

Extent shown:
Blocks chosen: ABK, APP, FB, FDEF, QUER

System: SG-ME9-0
Project: MEDC17
Project code: GEA2SI/P040C700;0

Responsible: Gabriele Eilber
Department: GS-EC/EDG1
Phone: 33717
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2463	KHMD	1.100.0	Calculation of torque reserve for heating catalytic converter
1209	KOEVAB	2.20.0	Coordination of injection valve cutoff
81	KONCW	22.10.0	Configuration via code words
3039	KOS	165.20.0	Control of A/C compressor
1718	KRADAP	3.11.0	Knock control: stationary adaptation
1721	KRDY	37.10.0	Knock control for load dynamics
1779	KRKE	25.10.2	Knocking detection
1726	KRLZ	2.20.0	Knock control: guide cylinder function
1732	KRREG	2.20.0	Knock control: stationary control
1741	KRSWADP	1.10.0	Knock control; software transfer interface
1701	KRUE	2.10.0	knock control overview
3516	KTEEP	1.30.1	F
2443	KTGGLSVFH	2.30.1	Component Driver determination of oxygen sensor voltage
1221	KT_INJEC	5.60.0	Component driver injection ME9 ECU
1152	KVA	60.30.1	Output signal: display of fuel consumption
2465	LAKH	4.100.1	Lambda coordination for catalyst heating
2487	LAMBTSS	2.180.3	Lambda component protection
1057	LAMFAW	11.10.1	F Lambda vehicle-operator demand
1062	LAMKO	9.121.0	Lambda coordination
1071	LANSWL	2.20.2	Lambda during afterstart and warm-up
2038	LASO2SV	1.20.0	Interface of Commanded Equivalence Ratio to OBD Service
1026	LDOB	31.30.0	Boost control overboost
1044	LDRPID	28.10.0	Boost control pid-controller
1030	LDRPLS	5.70.1	Berechnung desired boost pressure
1052	LDRSTKO	1.10.0	Boost Pressure Actuator Coordination
1028	LDRUE	34.30.1	F Overview boost control
1055	LDTVMA	27.10.1	Calculation and output pulse-duty cycle
202	LLRBB	505.50.0	Operating conditions of idle speed control
200	LLRMD	1.43.2	Torque-based idle-speed control - overall view
219	LLRMR	12.170.0	Torque reserve for idle speed control
224	LLRNS	534.230.0	Idle control; Nominal engine speed for idle speed control
206	LLRRM	11.230.0	Idle speed control: torque controller
2014	LOCOS2SV	1.10.4	Interface Oxygen Sensors Location for OBD2 Service \$01/\$02
3278	LR2SV	1.20.2	Interface for OBDII Service
1229	LRA	140.90.1	Lambda closed loop control; Adaptive pilot control
1248	LRA2SV	1.10.5	Connection %LRA to OBD Service
1250	LRAEB	19.30.8	Conditions adaptive pilot control
1308	LRAPHU	2.60.4	Formation of physical urgency of mixture adaptation
2040	LRS	21.60.1	Continuous lambda control
2068	LRSEB	20.100.0	Activation conditions for continuous Lambda control
2239	LRSHKC	2.70.0	F Lambda control (continuous) downstream of catalytic converter
2254	LRSHEB	2.120.2	Enable conditions closed loop control downstream catalyst
2268	LRSHKOUT	6.20.2	Encapsulation of trim control outputs
2276	LRSKA	6.150.0	Continuous lambda control additional function catalyst deoxidation
2227	LSU2SV	1.10.3	interface for mode \$01 Equivalence Ratio & Oxygen Sensor Current
376	MDAUTG	7.50.0	Calculation of torque actual value for gear control
367	MDBAS	43.10.0	Basic calculation for torque interface
150	MDBGGR	4.120.1	torque limitation minimum
3361	MDCAN	7.40.0	
3361	MDEXTERN	1.11.0	Interface torque structure to external control units
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355	MDFUE	8.100.2	Nominal-value input from nominal torque for airmass
380	MDIST	10.22.3	Engine torque calculation
343	MDKOG	1.250.2	Coordination torque intervention
352	MDKOL	26.30.1	Coordination torque intervention air path
144	MDMAX	2.10.1	Calculation maximum indicated torque
145	MDMIN	10.40.1	Minimum engine torque coordination
147	MDNSTAB	1.41.0	Torque: engine-speed stabilization
148	MDPED	1.10.0	Characteristic of Accelerator Pedal
361	MDRED	1.71.0	Calculation reduction stage from torque demand
359	MDRLMX	2.10.2	maximum desired air charge for nominal torque of charged engines
175	MDTRIP	1.80.1	Calculation of torque reserve for short trip
177	MDVER	5.170.0	Loss in engine torque
182	MDVERAD	4.90.0	Adaptation of torque loss
188	MDVERB	27.40.0	Torque demand by auxiliary systems (e.g. air conditioner, misc. consumers)
193	MDWAN	6.140.5	Torque of the AT-converter
3125	MDZUL	4.120.2	ETC monitoring concept: Calculation of maximum permitted set torque
365	MDZW	1.122.0	Calculation of torque in nominal ignition timing
1382	MITEB	1.10.1	Canister purge interaction on engine torque
3057	MLS	92.10.2	Electric cooling fan control
97	MS	3.0.0	Engine control overview
98	MSF	11.20.2	Engine control functions
1374	NDR	1.50.1	Fuel Pressure Control DECOS



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1376	NDRPSOL	2.40.1	Fuel Set Point Pressure DECOS
2626	NLDG	4.30.0	limp-home for defective engine speed sensor
2645	NLPH	9.10.0	limp-home for phase synchronization
156	NMAXMD	21.22.0	Engine speed limitation
2511	NMOT2SV	3.20.0	Interface NMOT to OBD service
770	NWEVDA	1.10.3	camshaft reduced shifting range by diagnosis exhaust system
771	NWEVO	2.41.0	camshaft control: restricted possibility to adjust camshaft by oil pressure
374	NWFW	2.60.1	Calculation: factor camshaft angle
792	NWSFAT	1.30.2	Camshaft control, target value setting via tester
803	NWSOLLA	2.200.3	Assigned target value of exhaust camshaft control
820	NWSOLLE	2.200.6	Assigned target value of intake camshaft control
719	NWSUE	6.20.0	Over view of camshaft control logic
1017	NWWUE	5.70.2	Calculation of camshaft overlap
3642	OILPRES	2.10.0	F Oil pressure calculation
1307	PID41DKV	1.10.2	Definition of PID41-Group for DKVS
2134	PID41HLS	1.10.2	Definition of PID41 group for lambda sensor heaters
2332	PID41KAT	1.20.0	PID\$41 for Catalyst diagnosis
2135	PID41LS	1.10.0	Definition of PID41 group for lambda sensors
3531	PID41TES	2.10.0	Definition of PID\$41-group for the evaporative system
3514	PWF	3.10.0	Power fail
2651	RDE	2.30.1	Detection of reverse rotation
3531	RECID	8.50.0	F Record identifier list
1167	RKTE	5.40.1	Calculation of effective injection time from relative fuel mass
3436	ROTBUF	1.10.0	Rotating Buffer
2229	RPLSU	2.30.3	Reference pump current control für LSU
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2231	SALSU	3.30.1	F Adjustment of LSU in air
3387	SIA_COMIFC	49.20.0	Immobiliser communication
3387	SIA_CORE	49.20.0	Immobiliser system
557	SREAKT	7.80.2	EGAS: safety concept, failure reactions
643	SRMHFM	3.30.2	intake manifold model with hot film mass meter
647	SRMSEL	3.60.0	Selection of intake manifold modelling
597	SRMUE	1.30.3	overview of intake manifold model
2941	SSTDMD	2.30.0	Diagnostic misfire detection: distribution groups
845	SSTNW	1.60.2	Calculation of setpoints for camshaftcontrol
1134	STADAP	6.130.0	Starting fuel adaptation
101	STECK	706.10.1	Plug pin arrangement
3103	STF	4.120.1	Starter release
3611	SWADAP	26.40.0	Software adapter
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3489	SYSCON	11.50.2	System state control
68	SYSKON	60.44.0	System constants
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3280	T2CBREI	1.10.0	Tester Communication: Read ECU Identification (boot block)
3290	T2CC	1.10.1	Ford demand for CommunicationControl tester service
3296	T2CDTCS	1.10.1	Service 0x85 "Control DTC Setting"
3298	T2DC	2.10.0	Tester Communication: Device control service
3297	T2DDDDP	1.10.0	Service Dynamically Define Diagnostic Data Packet for Ford C307ST
3287	T2DTCS	11.10.0	KWP2000: Read Diagnostic Trouble Codes By Status
3281	T2EDS	3.10.0	Tester Communication: Stop Diagnostic Session
3281	T2EDSA	2.10.1	F KWP2000: Stop Diagnostic Session (Application)
3282	T2END	5.10.0	Tester Communication: Stop Communication
3287	T2FCMD	8.10.1	KWP2000: Clear Diagnostic Information
3282	T2ID	3.10.0	F KWP2000: Read ECU Information
3291	T2IOCBCI	1.10.0	Service \$2F Input Output Control By Common Identifier on CAN for Ford
3290	T2RCISM	1.10.0	Service \$24 RequestCommonIDScalingMasking
3287	T2RDBC	6.10.0	KWP2000 Diagnosis communication - Read Data By Common Identifier
3287	T2RDBLI	2.10.0	KWP2000 diagnosis communication - Read Data By Local Identifier
3296	T2RDDP	1.10.0	Service Request Diagnostic Data Packet for Ford C307ST
3282	T2REI	1.10.1	KWP2000: Read ECU Identification
3285	T2RFFD	8.10.0	KWP2000: Read Freze Frame Data
3290	T2RMBA	7.10.1	Tester Communication: Read Memory by Adress
3294	T2RRRBLI	8.10.0	KWP2000 Diagnosis Communication - Request Routine Results By Local Identifier
3284	T2SAC	11.10.0	Tester Communication: Security Access
3283	T2SDM	1.20.0	Tester Communication: Set Diagnostic Mode
3284	T2SDS	8.10.0	Tester Communication: Start Diagnostic Session
3293	T2SPRBLI	8.10.0	KWP2000 Diagnosis Communication - Stop Routine By Local Identifier
3284	T2STC	1.10.0	KWP2000: Start Communication
3292	T2STRBLI	8.10.0	KWP2000 Diagnosis Communication - Start Routine By Local Identifier
3296	T2TP	8.10.0	KWP2000: Tester Present
3295	T2WDBLI	2.10.0	KWP2000 diagnostic communication: Write Data By Local Identifier
3299	TC1MOD	31.20.3	Tester communication CARB; Mode 1
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3317	TC3MOD	6.10.3	Tester kommunikation CARB; Mode 3
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3319	TC6MODC	1.10.3	Tester communication OBD; Mode / Service \$06 via CAN, output of test thresholds
3323	TC7MOD	11.10.4	Tester kommunikation CARB; Mode 7
3324	TC8MOD	26.20.0	Tester kommunikation CARB; Mode 8
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3520	TEBXM	2.10.0	
2018	TEMPKON	10.40.0	Temperature converting module
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3140	UFACCC	8.10.0	ETC monitoring concept: ACC input information monitoring for function monitoring
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3141	UFFGRC	7.20.0	ETC monitoring concept: Monitoring of Cruise Control of function monitoring
3144	UFFGRE	56.10.1	ETC monitoring concept: CC input information used in function monitoring
3160	UFMIST	12.20.2	ETC monitoring concept: Actual torque
3147	UFMSRC	22.10.0	ETC monitoring concept: MSR intervention monitoring for function monitoring
3165	UFMVER	4.12.0	ETC monitoring concept: Torque monitoring of function monitoring
3168	UFMZP	2.12.0	ETC monitoring concept: Torque filter for function monitoring
3172	UFMZUL	16.30.3	ETC monitoring concept: Calculation of permissible torque in function monitoring
3178	UFNC	4.41.0	ETC monitoring concept: Monitoring of engine speed for function monitoring
3183	UFNSC	5.40.2	ETC monitoring concept: Afterstart monitoring for function monitoring
3211	UFREAC	11.10.3	ETC monitoring concept: Monitoring of fault reaction of function monitoring
3150	UFRKC	5.10.0	ETC monitoring concept: required/actual lambda-check in function monitoring
3153	UFRLC	15.10.0	ETC monitoring concept: Monitoring of load signal for function monitoring
3149	UFSGSC	8.10.0	ETC monitoring concept: SGS intervention monitoring for function monitoring
3131	UFSPSC	27.10.0	ETC monitoring concept: Monitoring of accelerator pedal value for function m.
3130	UFUE	17.10.0	ETS monitoring concept: function monitoring overview
3188	UFVARC	3.10.0	ETC monitoring concept: monitoring of variant criterion
3190	UFZWC	11.10.0	ETC monitoring concept: Monitoring of ignition angle for function monitoring
3217	UMAUSC	8.20.1	ETC monitoring concept: test of the shut-down path of the monitoring module
3223	UMKOM	11.10.1	ETC monitoring concept: Inquiry/response communication between UM/FR
3233	URADCC	16.30.0	ETC monitoring concept: test of the AD-converter
3238	URCPU	21.20.0	ETC monitoring concept: instruction test by means of level 2'
3240	URMEM	4.20.1	ETC monitoring concept: cyclic memory test
3244	URPAK	2.20.0	ETC monitoring concept: program flow check
3246	URRAM	4.70.0	ETC monitoring concept: RAM-test
3248	URROM	4.90.0	ETC monitoring concept: ROM-test
3250	URTPU	1.70.0	ETC monitoring concept: TPU-monitoring
3037	VFZG2SV	1.20.4	Interface VFZG for OBD service
162	VMAXMD	5.10.0	Torque request of Vmax regulation.
1379	VSTPCM	1.110.1	Feed forward control PCM for DECOS
2514	WANWKW	19.30.0	Angle adaptation of alignment between camshaft and crankshaft
428	WDKSOM	2.40.0	calculation of desired throttle angle without torque structure
968	WNWRA	12.40.1	Outlet Camshaft controller
990	WNWRE	12.40.2	Inlet camshaft controller
1605	ZADMTL	2.30.1	State Machine for Tank Leak Diagnosis (DMTL)
1643	ZUE	322.10.0	Basic function - ignition
1667	ZUESZ	8.50.4	Ignition, calculation of coil closing time
1676	ZWBAS	5.50.4	calculation ignition angles for zwbasar
1679	ZWGRU	27.60.0	Basic ignition angle
372	ZWKORWE	1.20.2	ignition angle correction at fuel feed restart
1682	ZWMIN	36.40.2	Calculation of maximum retarded spark limitation
1690	ZWOUT	5.60.3	Ignition angle calculation
1695	ZWSEL	6.40.1	ignition-calculation after advance/retard limitation
1699	ZWSTT	4.30.1	Ignition at start
1699	ZWWL	9.10.0	Ignition during warm-up
1700	ZWZYL2SV	1.10.5	supply of zwzyl1 (ignition angle of cylinder 1) for tester interface



FU ASCETBLK 1.10.0 Description of ASCET block library

FDEF ASCETBLK 1.10.0 Function definition

Representation of engine management functions:

To represent engine management functions physical information (data flow) is distinguished from digital control information (control flow).
Data flow: load signal, speed, control factor
Control flow: condition idle, switch driving position, error catalyst
Solid lines mark the data flow, dotted lines mark the control flow.



Baseblocks (general description):

- Blocks with marker "NOV" store the value of the output (integrator value, flag, RAM-cell) in a non volatile RAM (otherwise in a volatile RAM). The behaviour of these blocks is identical to their pendants without "NOV" marker.
- The main inputs and outputs ("in" and "out") have no symbol in the block icon; if there are no other characteristics their default values are 0.0 (float) bzw. FALSE (bool).
- Unconnected inputs are configured with 0.0 (float) bzw. FALSE (bool), if there are no other agreements.
- Some blocks have a special input at their left upper corner (default TRUE), usually connected with a calculation raster trigger to determine the frequency of calculation explicitly. Raster time describes the time gap between two cycles.
- Any deviation from following default configuration of input and output values will be described in the documentation of each block.

INPUTS:	brief in icon	default value	designation
E		TRUE	enable calculation
I		FALSE	initialization
IV		0.0	initial value
K		0.0	here: integration factor K
MX		1E35	upper limitation of output
MN		-1E35	lower limitation of output

ascetblk-teil0gb



Integrator K

new value of integrator := old value of integrator + K * rasterTime * in
INPUTS: K integration factor



Integrator T

new value of integrator := old value of integrator + (rasterTime / T) * in
The minimum value of T is limited to rasterTime.
INPUTS: T time constant of integration



Recursion

new value := old value + m * (in - old value)
INPUTS: m weighting factor



Lowpass

new value of lowpass := old value of lowpass + (rasterTime / T) * (in - old value of lowpass)
The minimum value of T will be limited to rasterTime.
INPUTS: T time constant



Input-Switchover

The icon shows the default position of the switch, default value of non-wired inputs is 0.0 .



Exclusive-OR

Output-signal is TRUE when exactly one input-signal is TRUE.



Edge (bidirectional)

A positive or negative edge at input triggers a TRUE at output during this simulation step.



Maximum (2 inputs)

The value of output is equal to maximum of all input values.
Output i indicates the index of first input generating maximum.

ascetblk-teil1gb



Limiters

The value of output-signal is equal to input-signal limited to the range [MN, MX].
TRUE at output "B" indicates an active limitation, otherwise this output is FALSE.



Absolute value

The value of output-signal is equal to absolute value of input-signal.



Hysteresis

Wiring of hysteresis determines right and left breakover point of hysteresis:
wired left breakover point right breakover point

LSP und delta	LSP	LSP + delta
LSP und RSP	LSP	RSP
delta und RSP	RSP - delta	RSP

All other wirings of the inputs LSP, RSP and delta produce FALSE as output-value (incorrect wiring).



Signum

Input value < 0.0, causes -1.0 at output, otherwise output value is equal to 1.0 .



Accumulator

The accumulator-value is changed by input-value and limited to the range [MN, MX].



FLAG

Imitation of one volatile 1 bit-RAM-cell.



RAM

Imitation of an volatile RAM-cell.

ascetblk-teil2gb



RS-FlipFlop

The RS-FlipFlop has a set-input S and a reset-input R, reset dominates set.
The value of output !Q is always inverted to output Q.



Delay raster

Signal delay by one cycle of calculation grid, out(i) := in(i-1).
A non-wired raster-input causes signal delay of one simulation step.



Turn-off delay

If input-signal switches from TRUE to FALSE the output-signal follows this alteration with a delay. Delay time is determined by input DELAY. Switching input to TRUE during delay time causes TRUE at output immediately.



Turn-on delay

If input-signal switches from FALSE to TRUE the output-signal follows this alteration with a delay. Delay time is determined by input DELAY. Switching input to FALSE during delay time causes FALSE at output immediately.



Timer

A positive Edge at input starts the timer running down:
- the start value of timer is determined by value at input SV (in seconds).
- the output switches to TRUE and stays TRUE until timer expires.
Further positive edges at input have no effect until the timer time has expired.
FALSE at input E stops the timer until TRUE at this input causes continuation of running down.

INPUTS: in start timers
SV start value of timer
OUTPUTS: B timer is running



Timer-Retrigger

Basic function like "Timer", difference: A further positive edge at input causes always restart of timer.

ascetblk-teil3gb

**Time-Counter**

TRUE at input resets time-counter to 0.0. R = FALSE, starts time-counter.
FALSE at input E stops the time-counter. The time-counter output shows the elapsed time in seconds.

INPUTS: R reset of time-counter

**Counter**

The counter will be incremented or decremented in every simulation step. True at input I causes determination of count-direction depending on actual startvalue and endvalue.
If value of input SV is greater than value of input EV then counter counts up, otherwise it counts down until endvalue is reached. Reaching endvalue will be indicated by TRUE at output B.

The counter may be stopped with help of input E.

INPUTS: SV startvalue of counter
EV endvalue of counter
I initialize and start counter

OUTPUTS: B endvalue reached

**Statemachine**

The control flow is represented by logical gate arrays and statemachines. The sequence control in a statemachine may be modeled with help of states and transitions.

State: In a statemachine is always exactly one state active, that means all corresponding (ellipses) actions will be done. The name of every state is represented inside the ellipsis.

Transition: The Transition from one state to an other one in case of fulfilling the state transition condition. (arrow) All corresponding transition actions will be done.

The condition, that will be checked for transition, is shown beside the transition arrow.

The string beside the transition is only a logical name representing the condition. The afterfollowing text contains the full description. The condition with the lowest number has the highest priority.

Every statemachine has exactly one welldefined start state (S) and a reset state (R).

If RESET-condition is fulfilled in any state, the reset state becomes actual state for next simulation step.

ascetblk-teil4gb

ABK ASCETBLK 1.10.0 Abbreviations**FB ASCETBLK 1.10.0 Function description****APP ASCETBLK 1.10.0 Application hints**

ascetblk-teil4gb

FU ASCETSDB 1.25.1 ASCET-SD descripton of block library

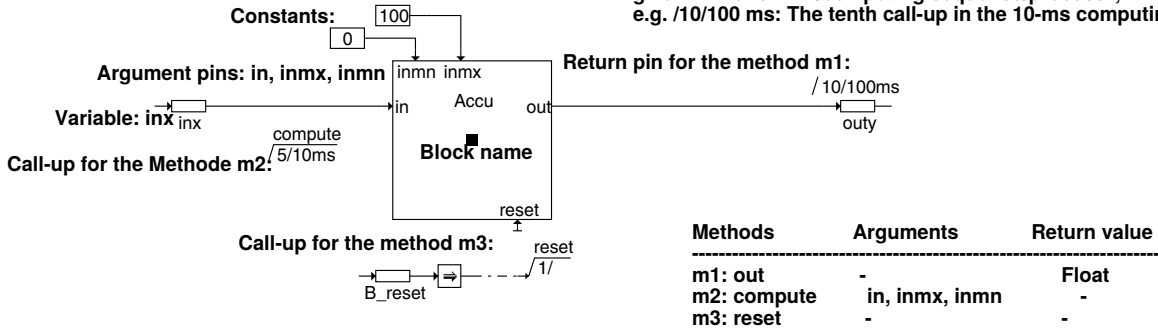
FDEF ASCETSDB 1.25.1 Function definition

Graphical presentation of basic elements

Basic elements are presented in the diagram as rectangular blocks. Communication between basic elements is displayed by connecting lines. The interfaces between basic elements are the pins at the block edges. Each block has return pin that outputs the result from the block. In addition to this, there are argument pins that provide the inputs into the block as well as method pins that are used for those methods without input arguments and without return values.

The methods call up functions in the block.

The process information and the computing sequence are given in the form: "/computing sequence/process", e.g. /10/100 ms: The tenth call-up in the 100-ms computing frame

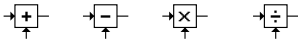


The example given above shows a block with 3 methods:

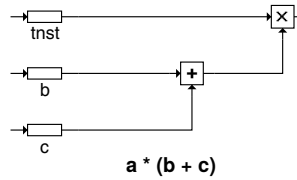
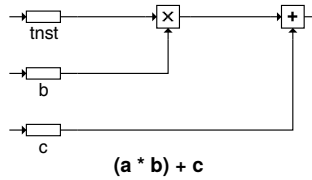
- The method m1 "out" has one return value
 - The method "out" is called up by the request for the return value from the subsequent block outy, that is in the tenth position in the computing sequence in the 100-ms computing frame.
 - The method m2 "compute" has three arguments (in, inmx, inmn) yet no return value.
 - The method "compute" is called up at the fifth position in the computing sequence in the 10-ms computing frame.
 - The method m3 "reset" has neither arguments nor a return value. This is therefore represented by the "method pin".
- If B_reset is true, then the method "reset" is called up first (1/) in the computing sequence.



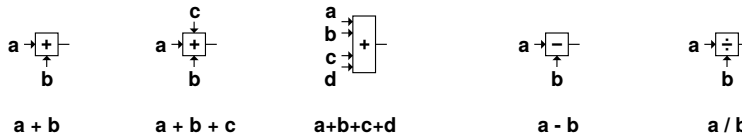
Arithmetic operations



Equations can be described using arithmetic operations (addition, subtraction, multiplication and division). Equations are represented graphically such that the return value of an operation is the argument for the subsequent operation.



The arguments of primitive operations and their computing sequence are shown in the following:



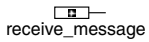
$a \rightarrow \text{[-]} \leftarrow b$ **Negation: $b = -a$**

$a \rightarrow \text{[|x|]} \leftarrow b$ **Amount: $b = |a|$**

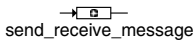
$a \rightarrow \text{[MX]} \leftarrow b$ **Maximum for input values: $c = \text{MAX}(a,b)$**

$a \rightarrow \text{[MN]} \leftarrow b$ **Minimum for input values: $c = \text{MIN}(a,b)$**

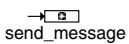
Variables



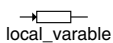
Receive message are input variables of the function that are made available from another function.



Send/Receive variables are output variables of the function that are used both within as well as outside of the function.



Send messages are output variables of the function and are available for the other functions.



Local variables are only made available and used within the function.

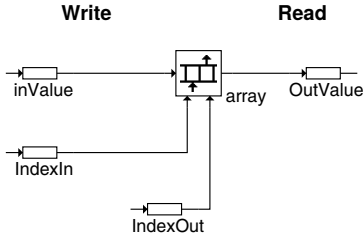


Arrays and matrices

Arrays and matrices have two methods for reading and writing access to the elements. The reading and writing can be independent of one another.



array

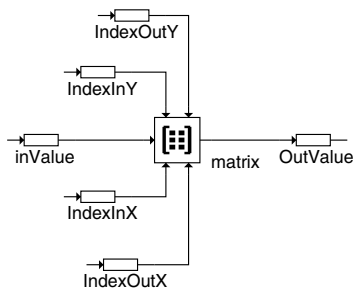


Array:

- The value to be written is connected to the left pin, the associated index to the lower left pin.
- The value to be read is connected to the right pin, the associated index to the lower right pin.



matrix



Matrix:

- Matrices behave as arrays, whereby the methods here have two index arguments (x, y):
- The index x is connected to the lower left, the index y to the upper left pin for writing access.
 - The index x is connected to the lower right, the index y to the upper right pin for reading access.

1

-1.3

Constants

true

false

Boolean Constants

System constants

SY_ZYLZA

System constants are constants that are permanently anchored in the program and cannot be applied. System constants can switch functional positions conditionally on or off.

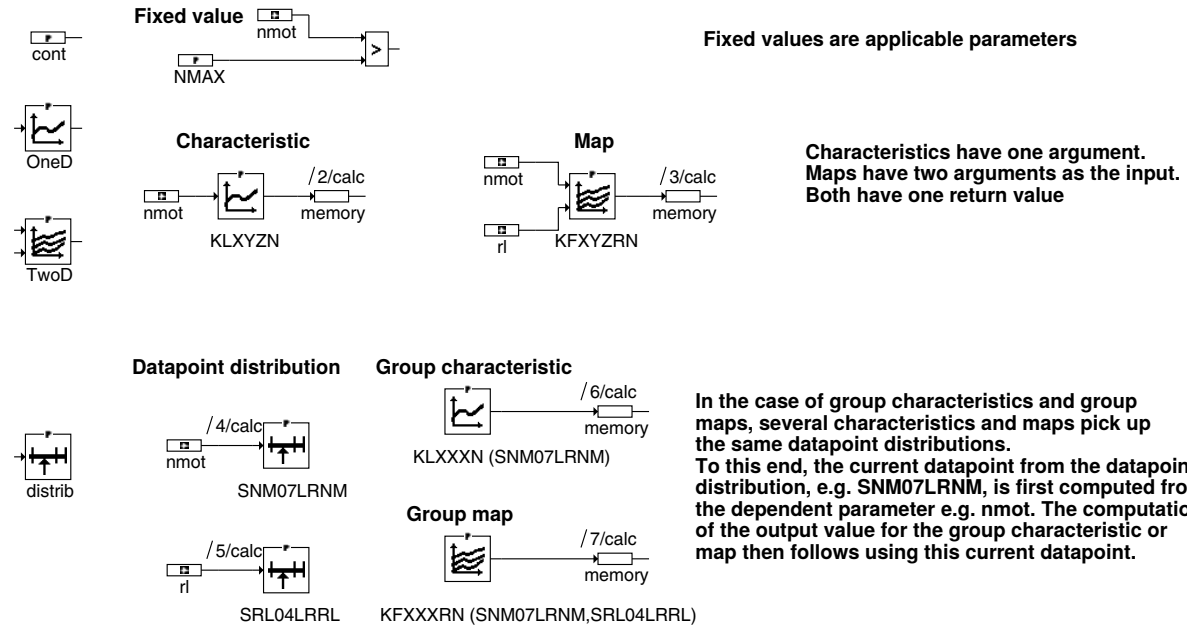
SY_TURBO

Example

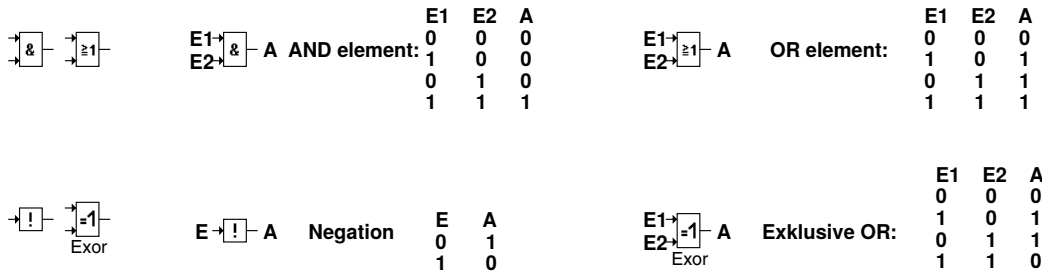
SY_ZYLZA: Cylinder number
SY_TURBO: Engine with or without turbo-charger



Fixed values, Characteristics, Maps, Group characteristics, Group maps and datapoint distribution

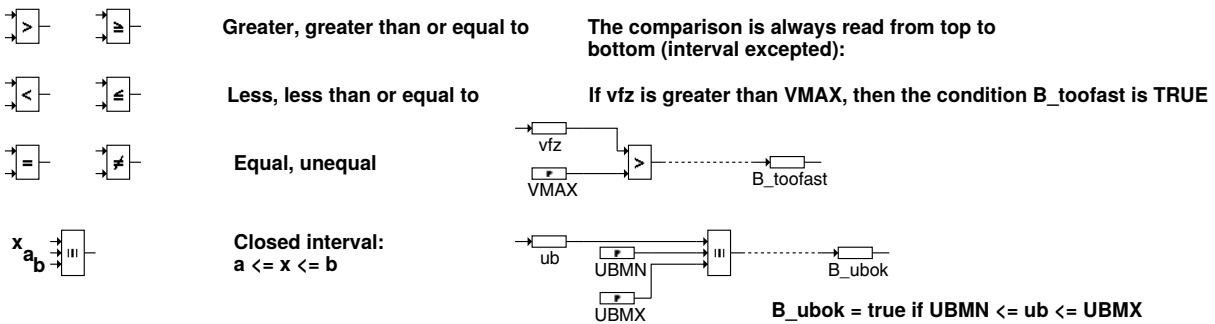


Bit operations

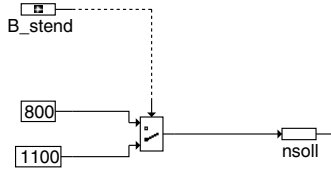


Comparator

The comparator provides TRUE at the output if the comparison applies. If the comparison is not fulfilled, then FALSE is given as the output.

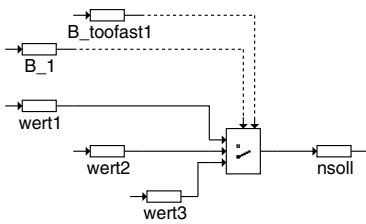


Multiplex operator "Multiplexer", "Switch"



A multiplexer switches a value through to the output as a dependency of the input conditions. The multiplexer icon is shown in the dormant position, i.e. if the input conditions are false.

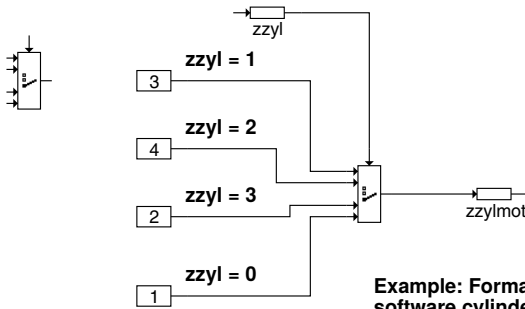
Example "Simple multiplexer"
 - if B_stend = false: nsoll = 1100
 - if B_stend = true: nsoll = 800



An input condition is assigned to each value in the case of cascaded multiplexers. The uppermost value, the input condition for which is true, is switched through. If there is no input condition of true, then the lowest value is switched through.

Example "Mehrfach-Muxer":
 - if B_1 = true: nsoll = value1
 - if B_1 = false & B_2 = true: nsoll = value2
 - if B_1 = false & B_2 = false: nsoll = value3

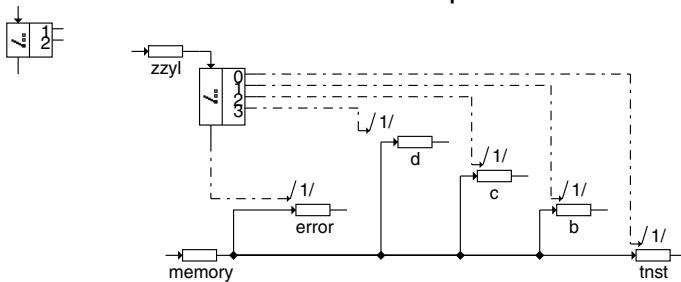
CASE operator



The CASE operator switches one of the remaining left inputs through to the output as a dependency of a top-applied discrete control value (1, 2, 3, ...). If the control value 1 is the first value, then 2 is the second value and is switched through immediately. If the value is outside of the range, then the lowest input (default) is switched through.

Example: Formation of the physical cylinder number onto the software cylinder number.

Switch



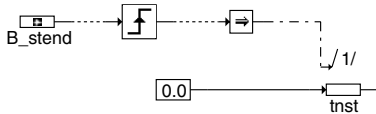
The SWITCH operator activates the matching control flows over the right-hand outputs as a dependency of an upper applied discrete control value (1, 2, 3, ...). If there is no matching output existing, then the control flow is activated at the lower output.

Example:
 One of the following operations is executed depending on zzyl:
 - if zzyl = 0: a = memory
 - if zzyl = 1: b = memory
 - if zzyl = 2: c = memory
 - if zzyl = 3: d = memory
 - otherwise: error = memory

If then



The If .. Then operation analyzes a logic condition and activates all computing sequences for TRUE that are connected to the control flow. The computing sequence is defined by the numbering.

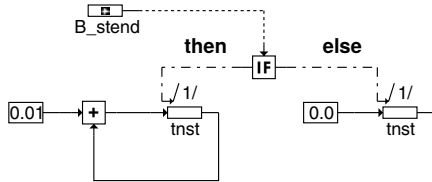


Example:
If B_stend changes to true, then tnst = 0 is set.

If then IF else



The IF .. Then .. Else operation analyzes a logic condition and activates all computing sequences of the then control branch for TRUE, and all computing sequences of the else control branch for FALSE. The computing sequence at each control branch is defined by the numbering.



Example: If B_stend = true, then tnst is incremented by 0.01 sec. in the 10-ms time frame. Otherwise (B_stend = false) tnst = 0 is set.

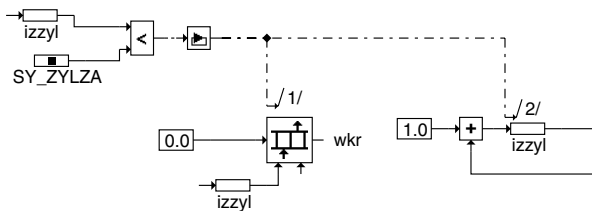
Mule bridge for IF:

I=True <-- IF --> F=False

While loop



The computing sequence within the control flow of the loop is executed for such a time as the input condition is fulfilled, i.e. is TRUE. The loop is aborted when the input condition is FALSE. The value for terminating the While loop is normally formed within the loop. This usually concerns a counter here that shall count up to a certain value.



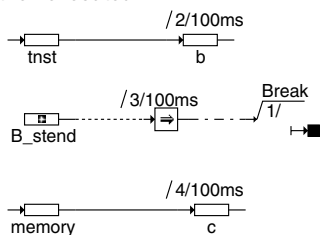
Example:
The array wkr[i] is written with 0 for such a time as izyyl < SY_ZYLZA. Each element of the array is initialized with 0 by the numerical variable izyyl at the index input of the array.

Break



The break operation prematurely interrupts a process, e.g. the functions component in a computing frame. All subsequent calculations of the function in the process with a higher number for the computing sequence are not then executed.

Example:

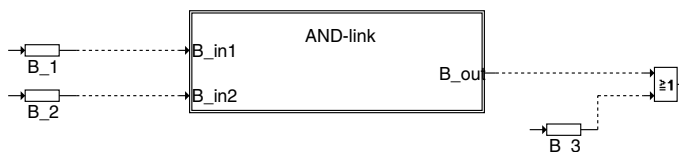


In accordance with the computing sequence, a break is triggered after the operation b = a exactly then when B_stend = TRUE. The 100-ms process is started if a break occurs. The subsequent operation, c = memory, is no longer executed.

Hierarchy:



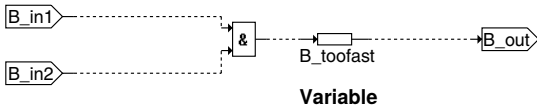
The hierarchy is graphical possibility for structuring functions. The hierarchy block is identified by a double border. The corresponding hierarchy level is identified by the name, here "AND link". The transfer element is only a designator for the links between both levels.





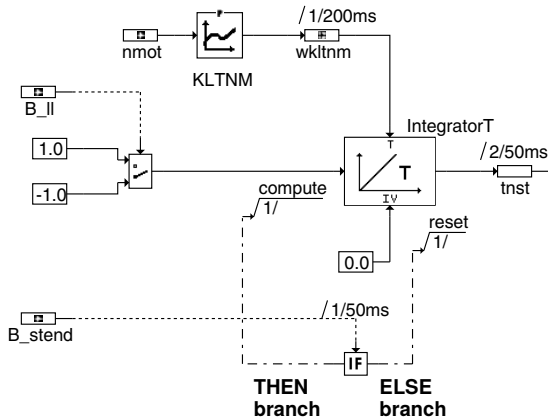
Function in the graphical "AND link" hierarchy:

Designator for input links



Designator for return links

Example



The method "reset" of the integrator is executed in the 50-ms computing frame as long as the condition $B_stend = FALSE$. This method causes the internal memory cell of the integrator to be initialized with the IV-value, i.e. 0.0. If the condition now becomes $B_stend = TRUE$, then the left-hand control flow is activated and the method "compute" has as the arguments time T and the input value. This depends on B_II . The input value = 1.0 for $B_II = TRUE$; the input value = -1.0 for $B_II = FALSE$. The number in front of the computing frame indicates the computing sequence: The time constant T is computed in the 200-ms computing frame and the message wkltnm is stored in Send/Receive. The IF .. THEN .. ELSE query is first executed in the 50-ms computing frame. The integration value is written into the variable a in the second step.

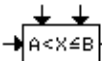
ASCET-SD System Library

Comparators



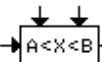
ClosedInterval
ClosedInterval returns TRUE, if the value x is in the closed interval defined by A and B.

Methods	Characteristics	Arguments	Return Value
out	TRUE is returned, if $A \leq x \leq B$. Otherwise FALSE is returned.	x::continuous A::continuous B::continuous	TRUE or FALSE



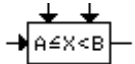
LeftOpenInterval
LeftOpenInterval returns TRUE, if the value x is in the left open interval defined by A and B.

Methods	Characteristics	Arguments	Return Value
out	TRUE is returned $A < x \leq B$. Otherwise FALSE is returned.	x::continuous A::continuous B::continuous	TRUE or FALSE



OpenInterval
OpenInterval returns TRUE, if the value x is in the open interval defined by A and B .

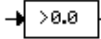
Methods	Characteristics	Arguments	Return Value
out	TRUE is returned, if $A < x < B$. Otherwise FALSE is returned .	x::continuous A::continuous B::continuous	TRUE or FALSE



RightOpenInterval

RightOpenInterval returns TRUE, if the value x is in the right open interval defined by A and B.

Methods	Characteristics	Arguments	Return Value
out	TRUE is returned, if $A \leq x < B$. Otherwise FALSE is returned.	x::continuous A::continuous B::continuous	TRUE or FALSE

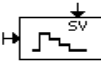


GreaterZero

GreaterZero returns TRUE, if the value x is greater than zero.

Methods	Characteristics	Arguments	Return Value
out	TRUE is returned, if $x > 0.0$. otherwise FALSE is returned.	x::continuous	TRUE or FALSE

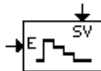
Counter & Timer



CountDown

CountDown decrements the counter and signals when the counter has reached zero.

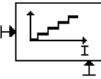
Methods	Characteristics	Arguments	Return Value
start	The counter is set to the start value .	startValue:: unsigned discrete	none
compute	The counter is decremented by one.	none	none
out	TRUE is returned if the counter is greater than zero. Otherwise FALSE is returned.	none	TRUE or FALSE



CountDownEnabled

CountDownEnabled decrements the counter and signals when the counter has reached zero. This counter must be enabled explicitly.

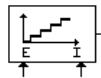
Methods	Characteristics	Arguments	Return Value
start	The counter is set to start value.	startValue:: unsigned discrete	none
compute	If enable is TRUE, the counter is decremented by one.	enable:: TRUE or FALSE	none
out	TRUE is returned if the counter is greater zero. Otherwise FALSE is returned.	none	TRUE or FALSE



Counter

Counter increments the counter by one.

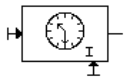
Methods	Characteristics	Arguments	Return Value
reset	The counter is set to zero.	none	none
compute	The counter is incremented by one .	none	none
out	The counter value is returned .	none	unsigned discrete



CounterEnabled

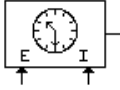
CounterEnabled increments the counter by one. This counter must be enabled explicitly.

Methods	Characteristics	Arguments	Return Value
reset	If initEnable is TRUE, the counter is set to zero .	initEnable:: TRUE or FALSE	none
compute	If enable is TRUE, the counter is incremented by one.	enable:: TRUE or FALSE	none
out	The counter value is returned.	none	unsigned discrete



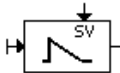
StopWatch
StopWatch increments the time counter by one dT.

Methods	Characteristics	Arguments	Return Value
reset	The counter is set to zero.	none	none
compute	The time counter is incremented by dT.	none	none
out	The time counter value, i. e. the time elapsed since the last start, is returned.	none	continuous



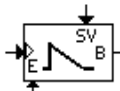
StopWatchEnabled
StopWatchEnabled increments the time counter by one dT. This timer must be enabled explicitly.

Methods	Characteristics	Arguments	Return Value
reset	If <code>initEnable</code> is TRUE, the internal counter is set to zero.	<code>initEnable::TRUE</code> or <code>FALSE</code>	none
compute	If <code>enable</code> is TRUE, the time counter is incremented by dT.	<code>enable::TRUE</code> or <code>FALSE</code>	none
out	The time counter value, i.e. the time elapsed since the last start and while <code>enable</code> was TRUE is returned.	none	continuous



Timer
Timer decrements the time counter by dT and signals when the time counter has reached zero. Its not retriggerable.

Methods	Characteristics	Arguments	Return Value
start	The time counter is set to zero, if the time counter value was previously less than or equal to zero.	<code>startTime::continuous</code>	none
compute	The time counter is decremented by dT.	none	none
out	TRUE is returned, if the time counter is greater then zero. Otherwise FALSE is returned.	none	continuous



TimerEnabled
TimerEnabled decrements the time counter by dT and signals when the time counter reaches zero. It must be enabled explicitly.

Methods	Characteristics	Arguments	Return Value
compute	If <code>enable</code> is TRUE, <code>in</code> has a rising edge and the time counter value is less or equal zero, the timer is started, i.e. its counter value is set to the start time. Otherwise the time counter is decremented by dT. If <code>enable</code> is FALSE nothing happens.	<code>enable::TRUE</code> or <code>FALSE</code> <code>in::TRUE</code> or <code>FALSE</code> <code>startTime::continuous</code>	none
out	TRUE is returned, if the time counter value is greater than zero. Otherwise, FALSE is returned.	none	continuous