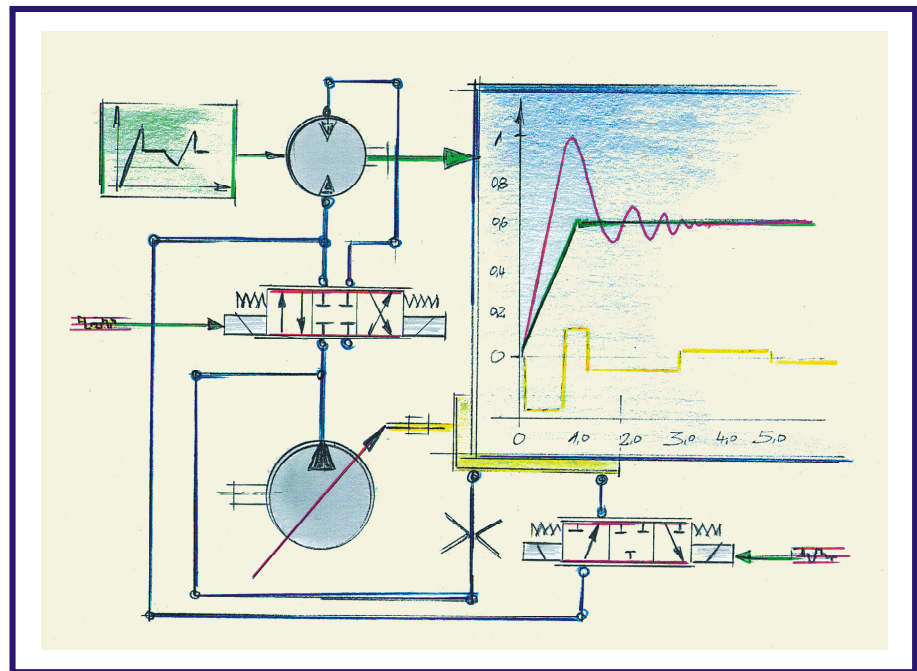


Component Manual

Modules



DSH^{plus}

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In the course of further development of the software, parts of this manual can lose their validity.

Introduction

The component manual describes the components of the library. In accordance with the component categories in the library, the manual subdivides itself into several parts:

- Component library Hydraulics
- Component library Pneumatics
- Component library Control,
- Component library Mechanics
- Component library Thermal Hydraulics
- Component library Modules
- Component library Miscellaneous

The **HYDRAULICS** part contains all hydraulic components of the library. This includes pumps and motors, flow valves, pressure valves, check valves, and directional valves as well as accumulators and pipes.

The **PNEUMATICS** part of the library includes many components for pneumatic systems. The components range from cylinders and resistors to directional valves and sensors.

In the manual part **MECHANICS** the mechanical components are described. These are the masses and the spring damper components as well as other mechanical components.

The component library of *DSHplus* includes analog and digital components for control tasks that are explained in the chapter **CONTROL**.

The **THERMAL HYDRAULICS** part contains thermal hydraulic components of the library. This includes pumps and motors and directional valves as well as accumulators and pipes.

The component manual should help to select the right component for a model and to parameterize it. Furthermore, there is information about the kind of modeling of the components, e. g. whether they were modeled in accordance with the physical qualities of the real components or whether only their dynamic characteristics were taken.

The **MODULES** contains the components for the *DSHplus*-STC and for the sub model prepare. The part **MISCELLANEOUS** contains other components to which the nodes in particular belong.

All components are described according to the same scheme. The following page shows an example component with which the scheme is explained.

ComponentName

Symbol of the component

Symbol

Sketch

Drawing of the component

Connectors and Variables

Name	Type	Unit	Description
<i>Hydraulic connector</i>	Hydr	Unit	<i>short description</i>
<i>Hydraulic volume less connector</i>	Hvol	Unit	<i>short description</i>
<i>Thermal hydraulic connector</i>	THydr	Unit	<i>short description</i>
<i>Pneumatic connector</i>	Pneu	Unit	<i>short description</i>
<i>Signal input</i>	In		<i>short description</i>
<i>Signal output</i>	Out		<i>short description</i>
<i>Mechanical connector</i>	Mech		<i>short description</i>
<i>Internal variable</i>	V		<i>short description</i>

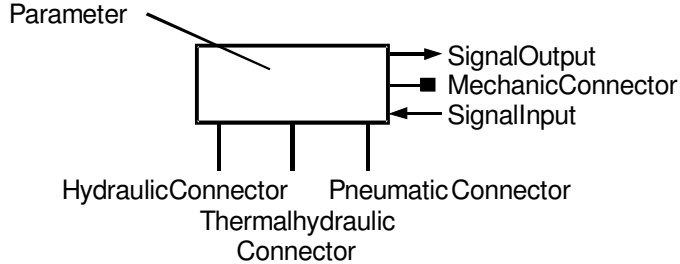
Parameters

Name	Value	Unit	Description
<i>Parameter name</i>	<i>Value</i>	<i>Unit</i>	<i>short description</i>

Notes

Remarks about function and application

Comments to the example component:

	The component symbol is the symbol with which a component appears in the library and in the model.														
	The component with its parameters and its connectors is represented in the component drawing according to the following figure:  The arrows at the component specify whether the connector is an input, an output or a mechanical connection. The direction of state variables is defined by a coordinate system.														
	In the table Connectors and Variables , all connectors and variables of a component are listed.														
	The connectors and variables of a component can be subdivided into different types. They are characterized in the column Type in accordance with: <table> <tbody> <tr> <td>Hydr:</td><td>hydraulic connector</td></tr> <tr> <td>Pneu:</td><td>pneumatic connector</td></tr> <tr> <td>Thydr:</td><td>thermal hydraulic connector</td></tr> <tr> <td>In:</td><td>input of a signal</td></tr> <tr> <td>Out:</td><td>output of a signal</td></tr> <tr> <td>Mech:</td><td>mechanical connector</td></tr> <tr> <td>V:</td><td>internal variable (state variable)</td></tr> </tbody> </table>	Hydr:	hydraulic connector	Pneu:	pneumatic connector	Thydr:	thermal hydraulic connector	In:	input of a signal	Out:	output of a signal	Mech:	mechanical connector	V:	internal variable (state variable)
Hydr:	hydraulic connector														
Pneu:	pneumatic connector														
Thydr:	thermal hydraulic connector														
In:	input of a signal														
Out:	output of a signal														
Mech:	mechanical connector														
V:	internal variable (state variable)														
	Units (column Unit) were assigned to the variables. In so far as the customer does not change the Units, the graphic or numeric edition of the variables occurs with these Units. The units for the values of the other connectors are listed only for better understanding.														
	In the parameter list, all parameters are listed with its Values and Units with which a component is described.														
	The Notes give further remarks to the function and the application of the component.														
	The following spelling is used: COMPONENTNAME <i>Parameters, Connectors and Variables</i>														

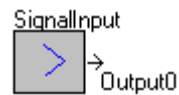
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Modules

STC Interfaces

SignalInput



Symbol

Connectors and Variables

Name	Type	Unit	Description
Output0	Out	-	Output signal 1
Output1	Out	-	Output signal 2
Output2	Out	-	Output signal 3
Output3	Out	-	Output signal 4
Output4	Out	-	Output signal 5
Output5	Out	-	Output signal 6
Output6	Out	-	Output signal 7
Output7	Out	-	Output signal 8
Output8	Out	-	Output signal 9

Parameters

Name	Value	Unit	Description
Factor	1	-	Factors allocated to each channel separately
Offset	0	-	Offset allocated to each channel separately

Notes

The STC-interface element SIGNALINPUT is one main condition (nearby the component SIGNALOUTPUT) for linking the model to the target system and is used for the data transfer from the external program to the DSH*plus*-model.

If this component is used alone without the SignalOutput, it is only possible to start an interactive simulation with the standard interface. Beyond the sliding bars of the interactive simulation interface the signals are given manually.

It is quite important to use always the name SignalInput with a continuous number (e.g. SIGNALINPUT1, SIGNALINPUT2, SIGNALINPUT_FROMSIMULINK1, etc.). The number has to be placed coercively at the end of your chosen name!

The text in front of the name or behind it is arbitrary (TESTSIGNALINPUT1, SIGNALINPUT_TEST1). If this is ignored, the DSH*plus*-model is created correctly, but the data exchange vector is created wrong.

The number of elements, which are integrated in the simulation model, is not limited. The components have maximum nine, minimum one-signal port.

The outputs of the components SIGNALINPUT are connected to the inputs of the model.

The ports of the SIGNALINPUT have to be occupied without interruption. Otherwise, the model is created correctly, but the not connected ports are not considered in the data exchange vector with the external program. The signal positions in DSHplus are not the same like the positions in the data exchange vector, which is occupied continuously.

The parameterization occurs in a special dialogue, which is named like the SIGNALINPUT component. To identify the signals of the STC-module in the target program easily, it is provided to use the ability to set comments in a sensible manner. The coupling of the DSHplus-STC-module is advanced in the target program.

Comment	Factor	Offset
Channel 0: Cylinder load	0.001 kN	0
Channel 1: Valve signal	1	0
Channel 2: Pump signal	1	0
Channel 3:	1	0
Channel 4:	1	0
Channel 5:	1	0
Channel 6:	1	0
Channel 7:	1	0
Channel 8:	1	0

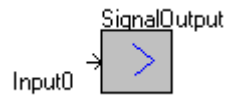
Channel Settings

Comment: Factor: +

U = Value * Factor [Unit] + Offset [Unit] Offset: +

Dialogue for parameterization of the component SignalInput

SignalOutput



Symbol

Connectors and Variables

Name	Type	Unit	Description
Input0	in	-	Input signal 1
Input1	in	-	Input signal 2
Input2	in	-	Input signal 3
Input3	in	-	Input signal 4
Input4	in	-	Input signal 5
Input5	in	-	Input signal 6
Input6	in	-	Input signal 7
Input7	in	-	Input signal 8
Input8	in	-	Input signal 9

Parameters

Name	Value	Unit	Description
Factor	1	-	Factors allocated to each channel separately
Offset	0	-	Offset allocated to each channel separately

Notes

The STC-interface element SIGNALOUTPUT is one main condition (nearby the component SIGNALINPUT) for linking the model to the target system and is used for the data transfer from the external program to the DSHplus-model.

It is quite important to use always the name SIGNALOUTPUT with a continuous number (e.g. SIGNALOUTPUT 1, SIGNALOUTPUT 2, SIGNALOUTPUT _FROMSIMULINK1, etc.). The number has to be placed coercively at the end of your chosen name!

The text in front of the name or behind it is arbitrary (TESTSIGNALOUTPUT1, SIGNALOUTPUT_TEST1). If this is ignored, the DSHplus-model is created correctly, but the data exchange vector is created wrong.

The number of elements, which are integrated in the simulation model, is not limited. The components have maximum nine, minimum one-signal port.

The outputs of the components SIGNALOUTPUT are connected to the inputs of the model.

The ports of the SIGNALOUTPUT have to be occupied without interruption. Otherwise, the model is created correctly, but the not connected ports are not considered in the data exchange vector with the external program. The signal positions in DSHplus are not the same like the positions in the data exchange vector, which is occupied continuously.

The parameterization occurs in a special dialogue, which is named like the SIGNALOUTPUT component. To identify the signals of the STC-module in the target program easily, it is provided to use the ability to set comments in a sensible manner. The coupling of the DSHplus-STC-module is advanced in the target program.

Comment	Factor	Offset
Channel 0: DSHplus velocity	1	0
Channel 1: DSHplus stroke	1	0
Channel 2: DSHplus acceleration	1	0
Channel 3:	1	0
Channel 4:	1	0
Channel 5:	1	0
Channel 6:	1	0
Channel 7:	1	0
Channel 8:	1	0

Channel Settings

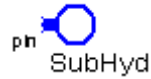
Comment: Factor:

Y = Value * Factor [Unit] + Offset [Unit] Offset:

Dialogue for parameterization of the component SIGNALOUTPUT

SubModels-In/Out elements

SubHyd



Symbol

Connectors and Variables

Name	Type	Unit	Description
PIn	Hydr	-	Hydraulic connection

Parameters

Name	Value	Unit	Description
-	-	-	

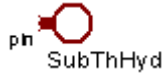
Notes

The component SubHyd is an element, which is used to create sub models. It has no parameters.

The component SubHyd is connected to a hydraulic node in the base model (the model which has to be prepared for sub model creation). The SubHyd presents the hydraulic connection in the sub model.

The name of the component SubHyd, respectively of the connection name in the sub model, has to be selected that way to couple the sub model in the complete model in a comfortable way.

SubThHyd



Symbol

Connectors and Variables

Name	Type	Unit	Description
Pin	Thermo	-	Thermal hydraulic connection

Parameters

Name	Value	Unit	Description
-	-	-	

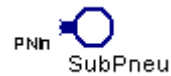
Notes

The component SUBTHHYD is an element, which is used to create sub models. It has no parameters.

The component SUBTHHYD is connected to a thermal hydraulic node in the base model (the model which has to be prepared for sub model creation). The SUBTHHYD presents the thermal hydraulic connection in the sub model.

The name of the component SUBTHHYD, respectively of the connection name in the sub model, has to be selected that way to couple the sub model in the complete model in a comfortable way.

SubPneu



Symbol

Connectors and Variables

Name	Type	Unit	Description
PNIn	Pneu	-	Pneumatic connection

Parameters

Name	Value	Unit	Description
-	-	-	

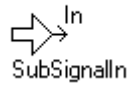
Notes

The component SUBPNEU is an element, which is used to create sub models. It has no parameters.

The component SUBPNEU is connected to a pneumatic node in the base model (the model which has to be prepared for sub model creation). The SUBPNEU presents the pneumatic connection in the sub model.

The name of the component SUBPNEU, respectively of the connection name in the sub model, has to be selected that way to couple the sub model in the complete model in a comfortable way.

SubSignalIn



Symbol

Connectors and Variables

Name	Type	Unit	Description
In	-	-	Signal connection

Parameters

Name	Value	Unit	Description
-	-	-	

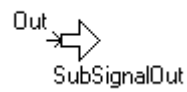
Notes

The component SUBSIGNALIN is an element, which is used to create sub models. It has no parameters.

The component SUBSIGNALIN is connected to a signal input connection in the base model (the model which has to be prepared for sub model creation). The SUBSIGNALIN presents the signal input connection in the sub model.

The name of the component SUBSIGNALIN, respectively of the connection name in the sub model, has to be selected that way to couple the sub model in the complete model in a comfortable way.

SubSignalOut



Symbol

Connectors and Variables

Name	Type	Unit	Description
Out	-	-	Signal connection

Parameters

Name	Value	Unit	Description
-	-	-	

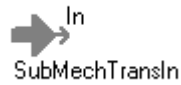
Notes

The component SUBSIGNALOUT is an element, which is used to create sub models. It has no parameters.

The component SUBSIGNALOUT is connected to a signal input connection in the base model (the model which has to be prepared for sub model creation). The SUBSIGNALOUT presents the signal input connection in the sub model.

The name of the component SUBSIGNALOUT, respectively of the connection name in the sub model, has to be selected that way to couple the sub model in the complete model in a comfortable way.

SubMechTransIn



Symbol

Connectors and Variables

Name	Type	Unit	Description
In	Mech	-	Mechanic translational connection

Parameters

Name	Value	Unit	Description
-	-	-	

Notes

The component SUBMECHTRANSIN is an element, which is used to create sub models. It has no parameters.

The component SUBMECHTRANSIN is connected to a translational node in the base model (the model which has to be prepared for sub model creation). The SUBMECHTRANSIN presents the input translational node in the sub model.

The name of the component SUBMECHTRANSIN, respectively of the connection name in the sub model, has to be selected that way to couple the sub model in the complete model in a comfortable way.

SubMechTransOut



Symbol

Connectors and Variables

Name	Type	Unit	Description
Out	Mech	-	Mechanic translational connection

Parameters

Name	Value	Unit	Description
-	-	-	

Notes

The component SUBMECHTRANSOUT is an element, which is used to create sub models. It has no parameters.

The component SUBMECHTRANSOUT is connected to a translational node in the base model (the model which has to be prepared for sub model creation). The SUBMECHTRANSOUT presents the output translational node in the sub model.

The name of the component SUBMECHTRANSOUT, respectively of the connection name in the sub model, has to be selected that way to couple the sub model in the complete model in a comfortable way.

SubMechRotIn



Symbol

Connectors and Variables

Name	Type	Unit	Description
In	Mech	-	Mechanic rotational connection

Parameters

Name	Value	Unit	Description
-	-	-	

Notes

The component SUBMECHROTI is an element, which is used to create sub models. It has no parameters.

The component SubMechRotIn is connected to a rotational node in the base model (the model which has to be prepared for sub model creation). The SubMechRotIn presents the input rotational node in the sub model.

The name of the component SubMechRotIn, respectively of the connection name in the sub model, has to be selected that way to couple the sub model in the complete model in a comfortable way.

SubMechRotOut



Symbol

Connectors and Variables

Name	Type	Unit	Description
Out	Mech	-	Mechanic rotational connection

Parameters

Name	Value	Unit	Description
-	-	-	

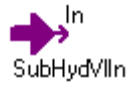
Notes

The component SUBMECHROTOU is an element, which is used to create sub models. It has no parameters.

The component SUBMECHROTOU is connected to a rotational node in the base model (the model which has to be prepared for sub model creation). The SUBMECHROTOU presents the output rotational node in the sub model.

The name of the component SUBMECHROTOU, respectively of the connection name in the sub model, has to be selected that way to couple the sub model in the complete model in a comfortable way.

SubHydVlIn



Symbol

Connectors and Variables

Name	Type	Unit	Description
IN	Hydr	-	Hydraulic volume less connection

Parameters

Name	Value	Unit	Description
-	-	-	

Notes

The component SUBHYDVLIN is an element, which is used to create sub models. It has no parameters.

The component SUBHYDVLIN is connected to a hydraulic volume less node in the base model (the model which has to be prepared for sub model creation). The SUBHYDVLIN presents the hydraulic volume less input node in the sub model.

The name of the component SUBHYDVLIN, respectively of the connection name in the sub model, has to be selected that way to couple the sub model in the complete model in a comfortable way.

SubHydVLOut



Symbol

Connectors and Variables

Name	Type	Unit	Description
Out	Hydr	-	Hydraulic volume less connection

Parameters

Name	Value	Unit	Description
-	-	-	

Notes

The component SUBHYDVLOUT is an element, which is used to create sub models. It has no parameters.

The component SUBHYDVLOUT is connected to a hydraulic volume less node in the base model (the model which has to be prepared for sub model creation). The SUBHYDVLOUT presents the hydraulic volume less output node in the sub model.

The name of the component SUBHYDVLOUT, respectively of the connection name in the sub model, has to be selected that way to couple the sub model in the complete model in a comfortable way.