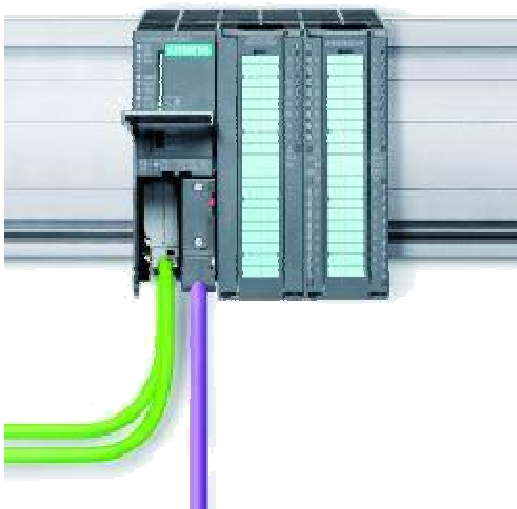




Grundfos SmartDigital DDA

***Metering Pumps with E-Box 150 Profibus
on Siemens S7-300 Control***



Grundfos SmartDigital DDA with E-Box 150 Profibus

Data Interchange Pump <-> S7

The metering pump has several different operating modes. However only two are practical when it is controlled externally over a Profibus.

Manual: In this mode the setting can be transferred via the bus. This mode is comparable to the "Analog" mode when the setting is specified by an analog signal.

Batch: In this mode the pump meters the set batch volume in the set metering time (t1). One batch is metered each time a contact is received.

In principle only few signals are required to operate the pump. On the one hand it is necessary to transfer the mode and the settings required for it, and, on the other, it is necessary to send the start and stop commands.

The pump can be operated with a minimum of signals.

Further data is practical for effective operation of the pump in a bus system. The following are to be sent:

- ControlModule
- SetpointManual
- SetBatchDosingVolum
- SetBatchDosingTime
- SetPressureMax

The metering pump can be operated satisfactorily in most applications with these signals.

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Since the pump provides a multitude of data via bus communication, it is possible to observe the status precisely.

The following are to be received:

- StatusModule
- ActualSetpointManual
- ActualBatchDosingVolume
- ActualBatchDosingTime
- ActualPressureMax
- FaultCode
- WarnigCode
- DosingCapacityMax
- DosingCapacityReference
- MeasuredDosingCapacity
- MeasuredPressure
- RemainingDosingVolume
- VolumeTripCounter
- DigitalInputs

Hardware Config

If the GSD file is known in the project planning tool, the bus subscribers can be compiled in the hardware config. In this case the bus address and input and output addresses are assigned to the individual modules.

To keep project work as simple as possible, we recommend copying a subscriber from a project template and inserting it into your project. Then it is only necessary to adapt the addresses.

Slot	DP Recognition	Order Number/Designation	I address	O address	Comments
1	164	ControlModule		400...404	
2	163	SetpointManual		406...409	
3	163	SetBatchDosingVolume		410...413	
4	163	SetBatchDosingTime		414...417	
5	163	SetPressureMax		418...421	
6	149	StatusModule	400...405		
7	147	ActualSetpointManual	406...409		
8	147	ActualBatchDosingVolume	410...413		
9	147	ActualBatchDosingTime	414...417		
10	147	ActualPressureMax	418...421		
11	8DE	FaultCode	422		
12	8DE	WarningCode	423		
13	147	DosingCapacityMax	424...427		
14	147	DosingCapacityReference	428...431		
15	147	MeasuredDosingCapacity	432...435		
16	147	MeasuredPressure	436...439		
17	147	RemainingDosingVolume	440...443		
18	147	VolumeTripCounter	444...447		
19	8DE	DigitalInputs	448		

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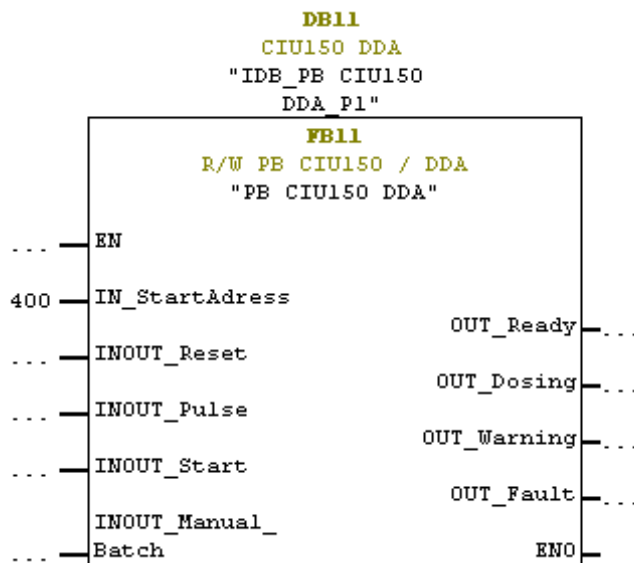
It is essential to maintain the address structure to use the available standard module.

The output addresses and the initial input addresses have the same range.

Here it is necessary to observe that the ControlModule is one byte shorter than the StatusModule. This byte can simply be skipped and left free.

Standard Module

The standard module can also be copied from the project template. It is only necessary to call this in a module, link it with an instance data module and assign the start address.



After transferring the hardware config and PLC program to the control, it is simple to access the data in the data module.

The standard module can be switched directly from an external point.

Input description:

StartAddress: First byte in pump peripheral area corresponding to setting in hardware configuration.

Reset: The "ResetFault" control bit can be set with a pulse. The metering pump acknowledges this control bit, whereby it is reset in the FB.

Pulse: Pulse signal for starting in batch mode. The metering pump acknowledges this control bit, whereby it is reset in the FB.

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Start: When the pump is ready for operation, the pump can be started in the set mode with TRUE. The pump can be stopped with FALSE.

Manual_Batch: Selection of metering mode (0=Manual 1=Batch).

Output description:

Ready: Returns status of "ActRemoteAccess" bit.

Dosing: Returns status of "Dosing" bit.

Warning: Returns status of "Warning" bit.

Fault: Returns status of "Fault" bit.

All other data is written or read directly via access to the DB.

The data and their functions are explained in the Grundfos manual "Profibus_Functionprofile_DDA"

Warnings and faults are transferred in detailed form via a numerical interface. The last fault and last warning are therefore resident in the control. However, since it is frequently necessary to process the individual messages as bits, the two codes are already decoded in the standard modules and transferred in bit form.

78.0	Alarms.ERR_MaxPressure	Error: Maximum pressure limit exceeded. ActualPressureMax (module 16) (Code 210)
78.1	Alarms.ERR_MinPressure	Error: Backpressure too low. Fixed underpressure limit (1.5 bar) (Code 211)
78.2	Alarms.ERR_BlockedMotor	Error: Blocked motor/pump (Code 51)
78.3	Alarms.ERR_EmptyTank	Error: Empty tank (dry running) (Code 57)
78.4	Alarms.ERR_DefectiveAnalog	Error: Defective analog 4-20 mA cable (Code 47)
78.5	Alarms.ERR_Profibus	Error: Profibus communication fault (main network communication fault) (Code 15)
78.6	Alarms.ERR_ExtensionBox	Error: Extension box communication fault (GENIbus communicat. fault) (Code 152)
80.0	Warnings.MSC_MinPressure	Warning: Backpressure too low. Fixed underpressure limit (1.5 bar). (Code 211)
80.1	Warnings.MSC_AirBubbles	Warning: Air bubbles, gas in pump head, deaerating problem. (Code 35)
80.2	Warnings.MSC_Cavitation	Warning: Cavitation. (Code 208)
80.3	Warnings.MSC_DischargeLeakage	Warning: Discharge (pressure) valve leakage. (Code 36)
80.4	Warnings.MSC_SuctionLeakage	Warning: Suction valve leakage. (Code 37)
80.5	Warnings.MSC_ServiceNow	Warning: Service now (time for service exceeded). (Code 12)
80.6	Warnings.MSC_ServiceSoon	Warning: Soon time for service (general service information). (Code 33)
80.7	Warnings.MSC_FlowDeviation	Warning: Flow deviation (performance requirement not met). (Code 17)
81.0	Warnings.MSC_LowLevel	Warning: Low level in tank. (Code 206)
81.1	Warnings.MSC_CableBreakdown	Warning: Cable breakdown on FlowControl. (Code 169)

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