Gateway between GRUNDFOS Bus and Building Management Systems

Software Package PMS-GW (C-Sourcecode and PC-Simulation Program) as a GRUNDFOS Part for Gateways

Gateways allow data transfer on bus level between GRUNDFOS Bus-compatible components at one end and building management systems (BMS) at the other end. Gateways are part of BMS, i.e. a component of sub stations.

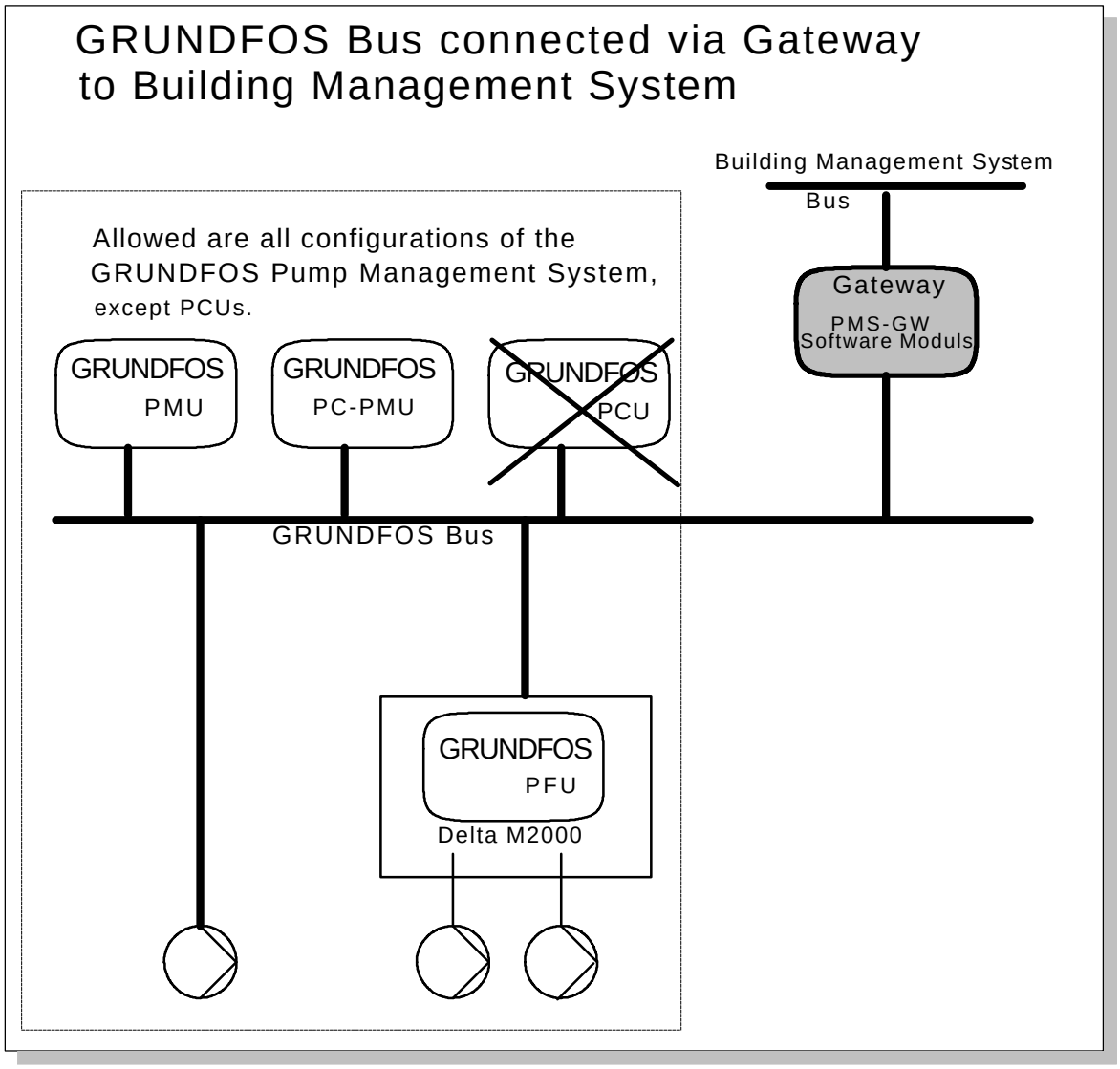
With the PMS-GW GRUNDFOS offers a software package of a C-sourcecode and a PC-simulation program for the GRUNDFOS components for free usage by BMS manufacturers. The purpose of PMS-GW is to support BMS manufacturers development of gateways.
In the C-sourcecode of the PMS-GW data transfer for operation and alarm- and operation monitoring as well as setpoint remote control is adapted to the functions of the GRUNDFOS components. The gateway functions include that of the present GRUNDFOS PCU 2000.

The datatransfer includes a subset of the data points, that have been defined until 25. October 1994 in the ad hoc working group "Fieldbus Systems" of the Arbeitskreis Heizungspumpen of VDMA Fachgemeinschaft Pumpen.

Additional detail informations are included in the documentation file PM--DOCU.C on the program diskette.

All informations given on the PMS-GW diskette are subject to alterations. They are confidential. Transmission to external third partys without written permission, given by GRUNDFOS, is not allowed. The copyright is owned by GRUNDFOS.

Example for an installation:



Functions:

-General:

• automatical identification and switch over between the operation within and without PMU 2000

• GRUNDFOS data points Mk1 are converted auomatically into Mk2.

• The installation and the operation condition of participants at the GRUNDFOS Bus are detected automatically at least within 30 seconds.
If the communication at the GRUNDFOS Bus with an active pump drops, 50 seconds later for that pump the data point "operation" is setted to *OFF, because of alarm* and all further data points of that now inactive pump will become invalid.

- without PMU:

• Master operation with 1..8 GRUNDFOS pumps (single pumps), each of this 8 pumps may be:
- UPE Mk1 ("old")
- UPE Mk2 ("new") or
- Pump/Motor controlled by PFU 2000

Remarks:

- The UPE pumps will operate according the setting at the pump (usually closed loop controll according constant head, not constant speed !)

- Switching to night operation of an UPE pump is not possible via Bus (according description remote control)

- After alarm at a pump and automatically restart of the pump, the alarm indication lamp at the pump will be deleted.

- within PMU:

• Simulation of 2 PCUs each for max. 4 pumps. With that, impact is possible to zones with more than one UPE pump and systems including Delta Control 2000 (i.e. pressure boosting plants become bus compatible).

Remarks:

- The zone configuration, as made in PMU via keyboard and display or at PFU 2000 by DIP switches, must be done at BMS too, because that configuration is not transmitted via the bus. For a possibly visualisation of pump systems, the hydraulic arrangement of the pumps has to be taken in account in the configuration of the BMS.

- Effect of the Remote Control:

• Remote ON/OFF: Effect to the particular pumps like with PCU.

• Setpoint Remote Control: 0..254 (0..100%)
with the setpoint remote signal narrowing 0, the lower operation point of pumps is limited to the minimum curve. (Switch OFF by remote ON/OFF)
100% = setpoint local (it remains unchanged):
without PMU: Setpoint setting at UPE or PFU
within PMU: Setpoint setting at PMU

- **Evaluation of Pump Data:**

• Speed: Variable speed pumps
0..254 (0..100%) at all variable speed main pumps
0..127 (0.. 50%) at variable speed halfsize pumps

• Speed: Pumps without speed controller, behind PFU 2000
OFF = 0 (0 %) and
ON = 254 (100 %) at one main pump
ON = 25 (10 %) at one pilot pump (small pump in a system)
ON = 127 (50 %) at one halfsize pump (pump with performance flow half of a main pump)

Only with UPE pumps (not with PFU 2000)

• Head	0..254 (0..100%)
Scale factor	0..254 in m
• Flow	0..254 (0..100%)
Scale factor	0..254 in 5 m^3/h
• Power	0..254 (0..100%)
Scale factor	0..254 in 0.5 kW

- **Operation:** actual operation condition

• OFF (because of local OFF or Alarm)	with UPE, PFU2000
• OFF (because of remote OFF at the pump)	with UPE, PFU2000
• OFF because of remote OFF via bus)	not used
• ready for operation	with UPE, PFU2000
• requested	not used
• operation in automatic mode	with UPE, PFU2000
• operation at MAX. (remote MAX. switching via bus)	not used
• operation at MAX. (remote MAX. switching at the pump)	not used
• operation at MAX. (local switching at the pump)	only with UPE

- Alarm: actual Alarm, classification and advice for action:

- no alarm at present

- The pump is presently switched OFF because of:

Supply Errors:

• Low voltage	remedy possible	- only with UPE
• High voltage	remedy possible	- only with UPE
• Line supply is missing	remedy possible	- only with UPE
• Phase error	remedy possible	- not used
• Line error general	remedy possible	- not used
• Water shortage	remedy possible	- only with PFU 2000
• Overpressure, max. limit exceeded	remedy possible	- only with PFU 2000
• min. limit remained below	remedy possible	- only with PFU 2000
• Others (Bus etc.)	fatal	- with UPE, PFU 2000

Pump Errors:

• blocked	remedy possible	- only with UPE
• Impeller, coupling	fatal	- not used
• Others	fatal	- with UPE, PFU 2000

Motor Errors:

• Overtemperature	remedy possible	- with UPE, PFU 2000
• Others	fatal	- not used

Elektronik Errors:

• Overtemperature	remedy possible	- not used
• Others (FU etc)	fatal	- only with PFU 2000

Sensor Error:

• Lead - or signal interruption	remedy possible	- only with PFU 2000

Remark: Alarms, marked by - *only with PFU 2000*, are system (zone) errors, that cannot be related to a certain pump. But they are transmitted within the protocol of the pumps with the lowest pump no. of the respective zone.