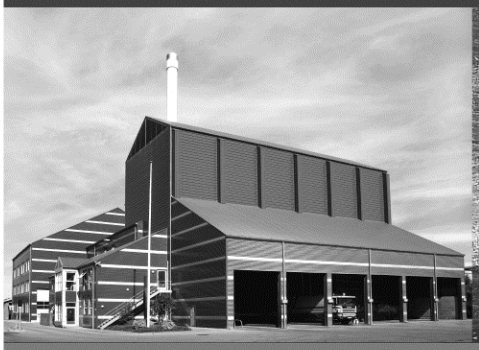
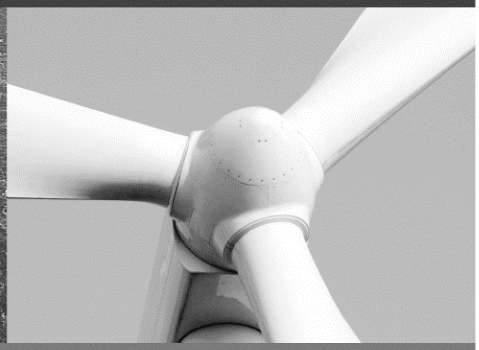
APPLICATION NOTES





DELOMATIC 400 GAS, DM-400 GAS

P&I diagrams

- Gas/air inlet
- Exhaust outlet
- Intercooler circuit
- Heating circuit
- Lubrication oil circuit
- Room air

DEIF A/S · Frisenborgvej 33 · DK-7800 Skive
Tel.: +45 9614 9614 · Fax: +45 9614 9615
info@deif.com · www.deif.com

Document no.: 4189340879A
SW version 1.33.3 or later

Table of contents

1. About this document

General purpose

This document contains the application notes for DEIF's Delomatic 400, DM-400, used in gas applications.

For functional descriptions, the procedure for parameter setup, complete standard parameter lists, etc., please see the Installation Instructions.

The general purpose of the application notes is to offer the designer information about the measurements and controls available in the standard DEIF DM-4 Gas.

Please make sure to read this handbook before working with the DM-400 controller and the genset to be controlled. Failure to do this could result in damage to the equipment or human injury.

Intended users

The document is mainly intended for the person responsible for designing DM-400 systems. In most cases, this would be a panel builder designer. Naturally, other users might also find useful information in this document.

Contents/overall structure

The document is divided into chapters, and in order to make the structure of the document simple and easy to use, each chapter will begin from the top of a new page.

2. Warnings and legal information

Legal information and responsibility

DEIF takes no responsibility for installation or operation of the generator set. If there is any doubt about how to install or operate the generator set controlled by the unit, the company responsible for the installation or the operation of the set must be contacted.

The DM-4 is not to be opened by unauthorised personnel. If opened anyway, the warranty will be lost.

Electrostatic discharge awareness

Sufficient care must be taken to protect the terminals against static discharges during the installation. Once the unit is installed and connected, these precautions are no longer necessary.

Safety issues

Installing the unit implies work with dangerous currents and voltages. Therefore, the installation should only be carried out by authorised personnel who understand the risks involved in working with live electrical equipment.

Be aware of the hazardous live currents and voltages. Do not touch any AC measurement inputs as this could lead to injury or death.

Definitions

Throughout this document, a number of notes and warnings will be presented. To ensure that these are noticed, they will be highlighted in order to separate them from the general text.

Notes

The notes provide general information which will be helpful for the reader to bear in mind.

Warnings

The warnings indicate a potentially dangerous situation which could result in death, personal injury or damaged equipment, if certain guidelines are not followed.

3. Abstract

This document is relevant for DM-400 Gas controlled gas engine based on Combined Heat and Power (CHP) installations using a gas/air mixer placed in the air intake of the engine.

The P&I diagrams gives an overview of the standard measurements and controls available for combined heat and power (CHP) in the DM-400 Gas. This means that in case one or more of the functions are not needed, they can be switched OFF simply by setting the DM-400 Gas selection for the function in question to OFF.

In case a function needed is not shown in the P&I diagrams, the function in question can be added. This document only represents the functionalities present in the standard DEIF DM-400 Gas controller.

All controller functions are based on real PID controllers, embedded in the DM-400 Gas controller. Digital/analogue inputs are as far as possible made configurable, so the numbering of the tags does not in any way represent actual inputs and outputs, but are indicating that the tag in question can be connected to the standard DM-400 Gas.

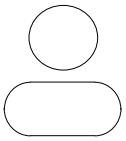
4. Tags and equipment numbers

Letter code table for instrumentation and measuring devices

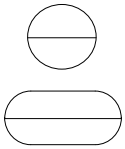
The letter codes are according to ISO 5311-1 and ISO 3511-2

Letter	First position	Second position	Following position (s)
	Measuring or input type	Modifier	Output
A			Alarm
B			
C			Control, regulation
D	Density	Differential	
E	Electric unit		
F	Flow	Relation	
G	Distance, position, length		
H	Manual (hand) controlled unit		High alarm
I		Indicator	Indicator
J		Query	
K	Time or time programme		
L	Level		Low alarm
M	Moisture or humidity		
N	Free. Can be used for types otherwise not mentioned.		
O			
P	Pressure or vacuum		
Q	Quality unit, e.g. analysis, concentration, conductivity.	Integral, sum	Integration or summation
R	Radiation		Registration
S	Speed, RPM, frequency		Switch
T	Temperature		Transmitter
U	Combined units (can replace a row of letters when these are combined in one instrument)		
V	Viscosity		
W	Weight, mass		
X	Other types (preferred over N, O and Y)		
Y	Free. Can be used for types otherwise not mentioned.		
Z			Emergency/safety switch
+			High limit
/			Intermediate value
-			Low limit

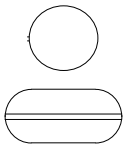
General symbols



Local instrument/control



Process control value

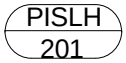


Control room

Symbols with letter code examples and identifier numbers

Level indicator

Level transmitter with item identifier



Pressure indicator with low and high level switch and item identifier

The item identifier number is freely selectable, but always specific to the item in question, i.e. the number can never be present twice.

5. Tags

Tag no	Type	Signal	Task
LT 001	Level transmitter	4-20 mA	Gas level
QT 002	CH_4 transmitter	4-20 mA	Gas quality
TT 003	Temperature transmitter	4-20 mA	Gas temperature before compressor
PT 004	Pressure transmitter	4-20 mA	Gas pressure before compressor
TT 005	Temperature transmitter	Pt100	Gas temperature after compressor
PZH 006	Pressure switch	Digital	Gas leak control safety switch
PSH 007	Pressure switch	Digital	Gas inlet press OK
TT 008	Temperature transmitter	Pt100	Natural gas temperature
PZH 009	Pressure switch	Digital	Natural gas leak control safety switch
PSH 010	Pressure switch	Digital	Natural gas inlet press OK
EU011	Actuator	Stepper motor or analogue	Mixer position actuator
TT 012	Temperature transmitter	Pt100	Manifold temperature
PT 013	Pressure transmitter	4-20 mA	Manifold pressure
	Actuator	Analogue	Throttle valve actuator
TT 015	Temperature transmitter	NiCrNi	Exhaust temp. bank A
TT 016	Temperature transmitter	NiCrNi	Exhaust temp. bank B
TT 017	Temperature transmitter	NiCrNi	Exhaust tem. after turbo
PSH 018	Pressure switch	Digital	Exh. pressure after turbo
GSH 019	Limit switch	Digital	Exh. bypass open
GSH 020	Limit switch	Digital	Exh. bypass closed
EU 021	Actuator	Analogue or digital	Exhaust bypass flap actuator
TT 022	Temperature transmitter	Pt100	Exh. temp after heat exchanger
TT 023	Temperature transmitter	Pt100	Water temp intercooler inlet
GT 024	Position feedback	4-20 mA	Intercooler system control valve
EU 025	Actuator	Analogue or digital	
TT 026	Temperature transmitter	Pt100	Engine coolant outlet temp.
TT 027	Temperature transmitter	Pt100	Engine coolant inlet temp.
TT 028	Temperature transmitter	Pt100	Heating water temp. after eng. heat exchanger.
TT 029	Temperature transmitter	Pt100	Heating water temp. before eng. heat exchanger.

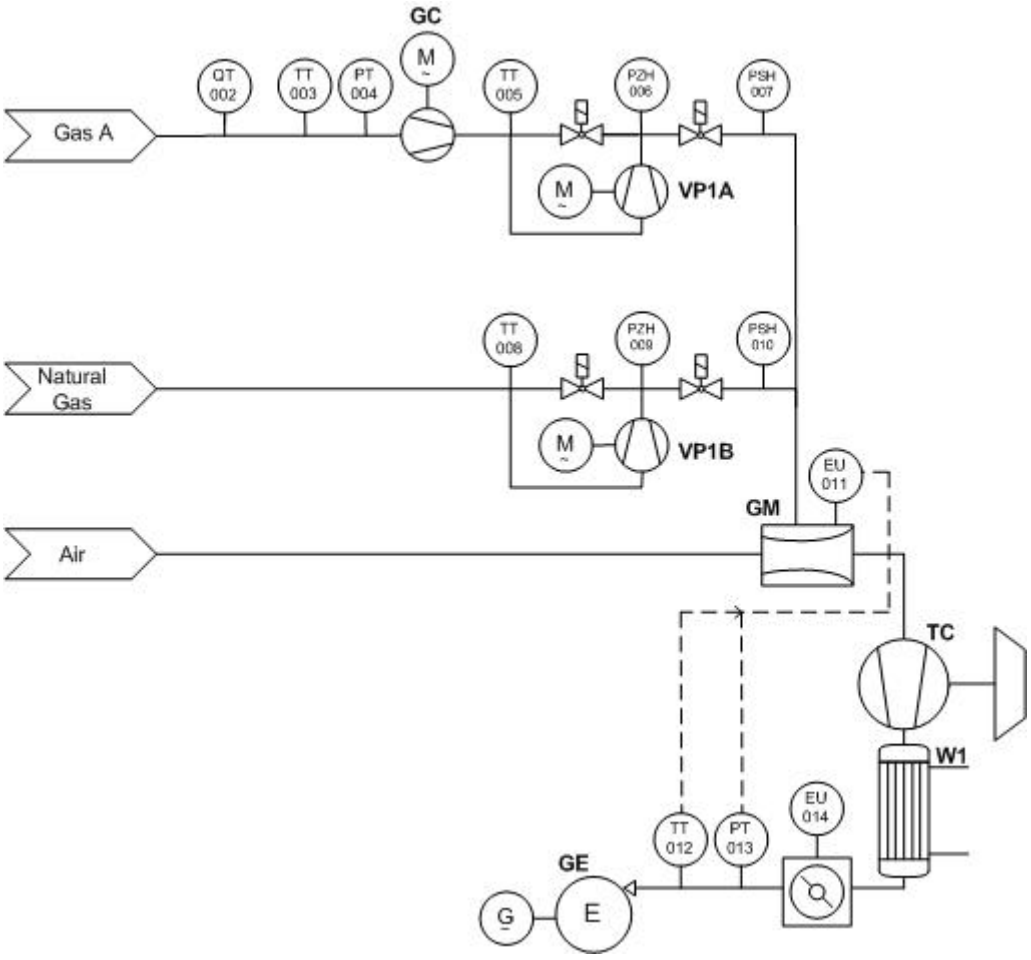
Tag no	Type	Signal	Task
GT 030	Position feedback	4-20 mA	Heating system control valve
EU 031	Actuator	Analogue or digital	
TT 032	Temperature transmitter	Pt100	Water temp after emer. cooler
TT 033	Temperature transmitter	Pt100	Heating water forward temp.
TT 034	Temperature transmitter	Pt100	Heating water return temp.
GT 035	Position feedback	4-20 mA	Emergency cooling circuit control valve
EU036	Actuator	Analogue or digital	
LSH 037	Level switch	Digital	Lube oil level high
LSL 038	Level switch	Digital	Lube oil level low
TT 039	Temperature transmitter	Pt100	Lube oil temperature
PT 040	Pressure transmitter	4-20 mA	Lube oil pressure
LT 041	Level transmitter	4-20 mA	Lube oil bulk tank level
GSH 042	Limit switch	Digital	Room air inlet louver gate open
GSH 043	Limit switch	Digital	Room air inlet louver gate closed
TT 044	Temperature transmitter	Pt100	Room air temperature
GSH 045	Limit switch	Digital	Room air outlet louver gate open
GSH 046	Limit switch	Digital	Room air outlet louver gate closed
EU 047	Frequency converter	4-20 mA	Room extract air fan speed

Unless otherwise stated, the equipment described is NOT DEIF supply.

6. P&I diagrams

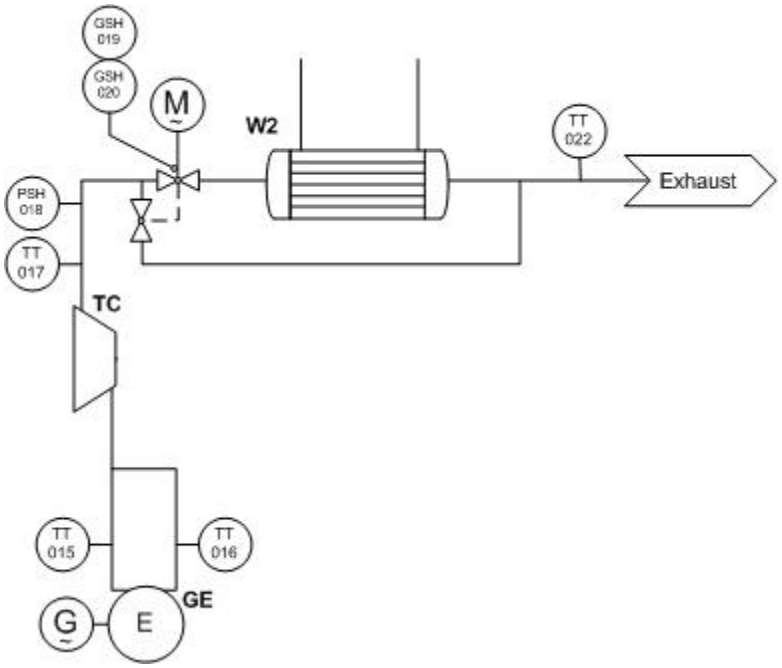
Unless otherwise stated, the equipment described is NOT DEIF supply.

Gas/air inlet



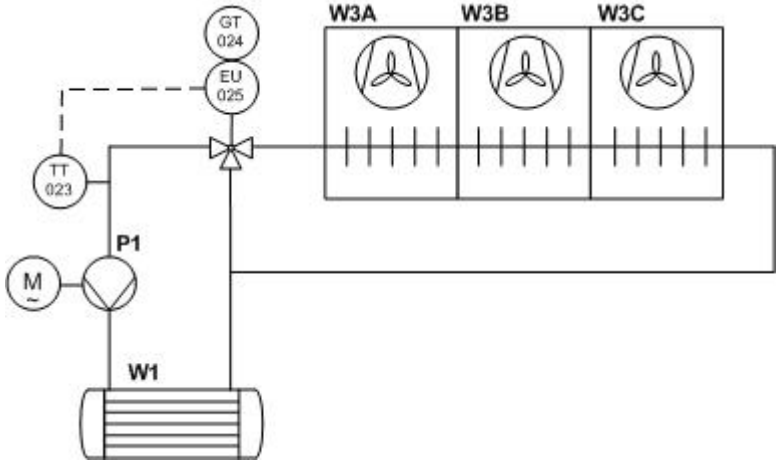
Abbreviation	GC	VP1A-B	GM	TC	W1	GE
Designation	Gas compressor	Vacuum pump	Gas Mixer	Turbo charger	Intercooler	Gas Engine

Exhaust system



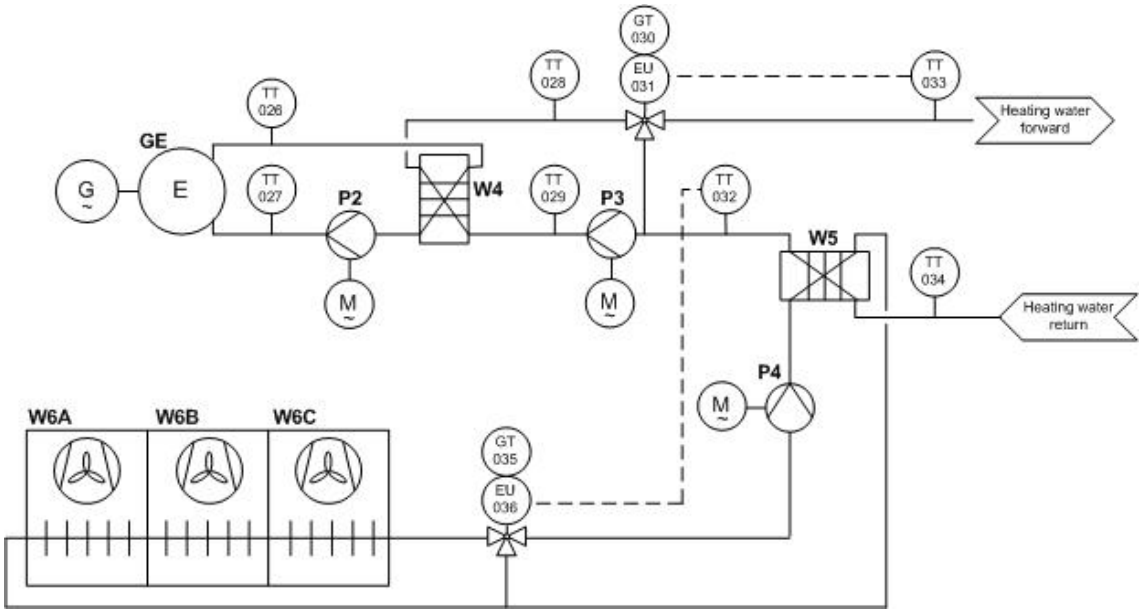
Abbreviation	TC	GE	W2
Designation	Turbo charger	Gas Engine	Exhaust heat exchanger

Intercooler circuit



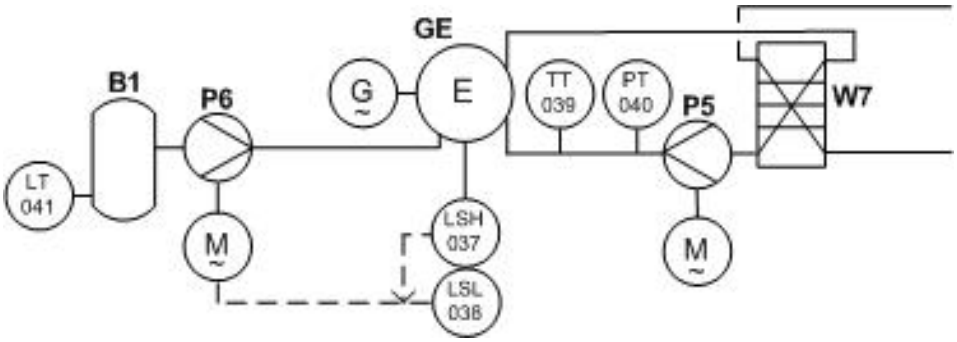
Abbreviation	W3A-C	P1	W1
Designation	Intercooler radiators	Intercooler pump	Intercooler

Heating circuit



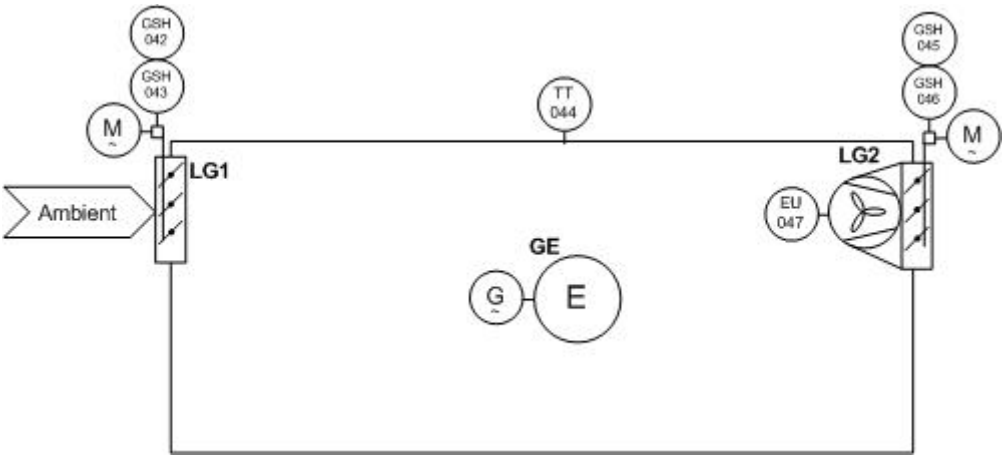
Abbreviation	GE	P2	W4	P3	W5	P4	W6A-C
Designation	Gas engine	Jacket water pump	Jacket water cooler	Heating water pump	Emergen-cy cooler	Emergen -cy cooler pump	Emergen -cy cooler radiators

Lube oil circuit



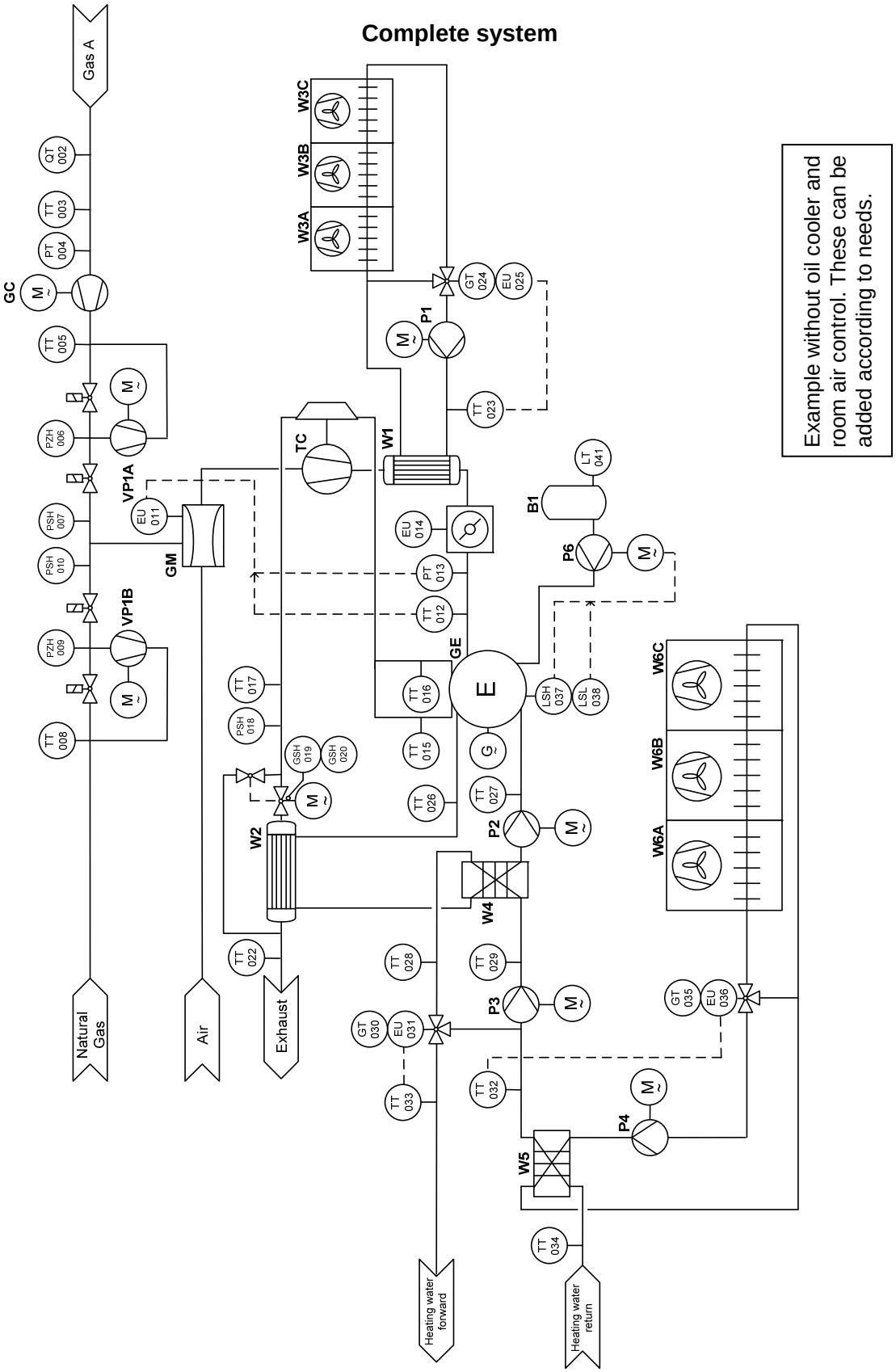
Abbreviation	GE	W7	P5	P6	B5
Designation	Gas engine	Lube oil cooler	Lube oil pump	Lube oil transfer pump	Lube oil storage tank

Room air



Abbreviation	LG1	GE	LG1
Designation	Motor-driven louver gate, air inlet	Gas engine	Motor-driven louver gate with fan, air outlet

Complete system



DEIF A/S reserves the right to change any of the above.