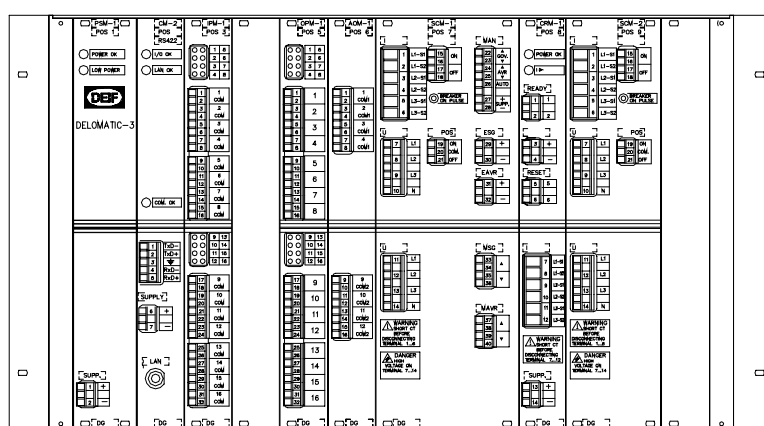


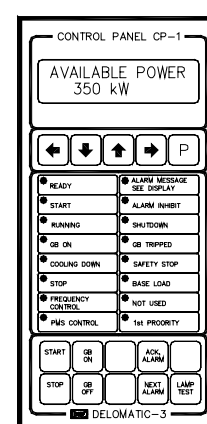
Delomatic - Multi-function system

System Data

4921240044E



DEIF Generator Unit



Control panel

- *A highly flexible system – a solution tailor-made to meet your demands.*
- *Provides exactly the functions you need.*
- *Comprises full documentation, factory acceptance test and support before, under and after commissioning.*
- *Integrates all protection and control functions needed in your application.*
- *Communicates easily with other systems and with the optional graphic user interface, just as it communicates easily with its operators too.*

Delomatic system in general

The Delomatic is a powerful Multi-Function System for control and protection of generator plants with advanced functions for maximizing the advantages of distributed power control.

The Delomatic system can be used in various types of power plants e.g.:

- Marine
- Power stations
- Local co-generation
- Combined heat and power

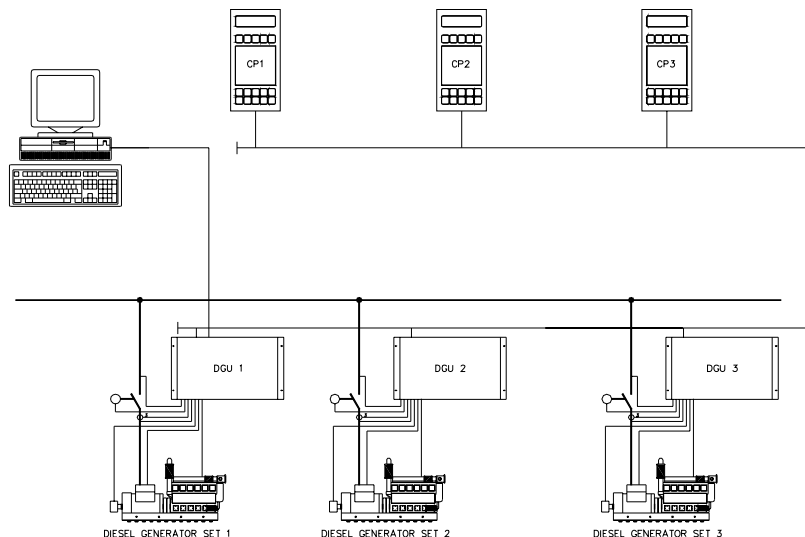
The Delomatic Multi-Function System for control and protection of generator plants is constructed of a number of DEIF Generator Units (DGUs), each with a number of corresponding Control Panels (CPs). Only one DGU is used per generator set, max. 3 CPs may be connected to each DGU. The CPs are slave units of the DGU, meaning that all settings remain active even if the control panel should break down.

The CP operates as an operator interface comprising:

- Display of all alarm messages on a LCD display.
- Display/change of parameter settings on a LCD display.
- Display of measured/calculated data on a LCD display.
- 16 LEDs are available for status and alarm displaying.
- 16 instruments may be connected to the control panel.

The interconnection between the DGUs and between each DGU and the corresponding CP(s) is carried out only by an ARC-network (a LAN network of token ring type). Max. eight DGU's with corresponding CP's are able to operate in the same ARC-network.

The DELOMATIC Multi-Function System is able to interface with a superior alarm/monitoring system through the CM-2 module, which adapts the ARC-network to traditional serial communication standards as RS232, RS422 and RS485 (MODBUS RTU). Furthermore, a communication protocol is available for a PC or PPC implemented with an ARC-network card. The DEIF Generator Unit (DGU) can perform as a custom designed multi-functional discrete component, according to the selected combination of the special DELOMATIC modules in the DGU.



Various special Delomatic modules are available:

- | | |
|-------|---|
| PSM-1 | The Power Supply Module for all Delomatic modules in the DGU. Some Delomatic modules require an external power supply for safety functions. One PSM-1 is needed for each DGU. |
| CM-2 | The Control Module carries out the control of the DGU according to the application program. One CM-2 is needed for each DGU. |
| IPM-1 | 16 input channel InPut Module (each channel may be configured as current, voltage or binary input). Max. 8 units in each DGU. |
| OPM-1 | 16 channel relay OutPut Module. Max. 8 units in each DGU. |
| AOM-1 | 8 channel Analog Output Module (each channel may be configured as bi- or uni-polarity and voltage or current output). Max. 8 units in each DGU. |
| CRM-1 | The Current Relay Module may function as either a short circuit protection module, as an earth fault current protection module or as a differential current protection module. Max. 4 units in each DGU. |
| SCM-1 | Multi-function module comprising e.g. generator protection, generator breaker ON/OFF control, measurement of all relevant 3-phase values and a precision synchronizer with corresponding outputs for engine speed etc. Max. one SCM-1 module may be used in each DGU. |
| SCM-2 | Multi-function module designed for e.g. shaft generator protection, breaker ON/OFF control, measurement of all relevant 3-phase values and synchronization of bus-tie breakers etc. Max. 3 units in each DGU. |
| PRM-1 | An advanced Protection Relay Module which offers a wide range of mains protective functions e.g. positive sequence voltage low, over- and underfrequency, over - and undervoltage, negative sequence current high etc. Max. 2 units in each DGU. |

Note! All Delomatic modules are delivered with removable connectors.

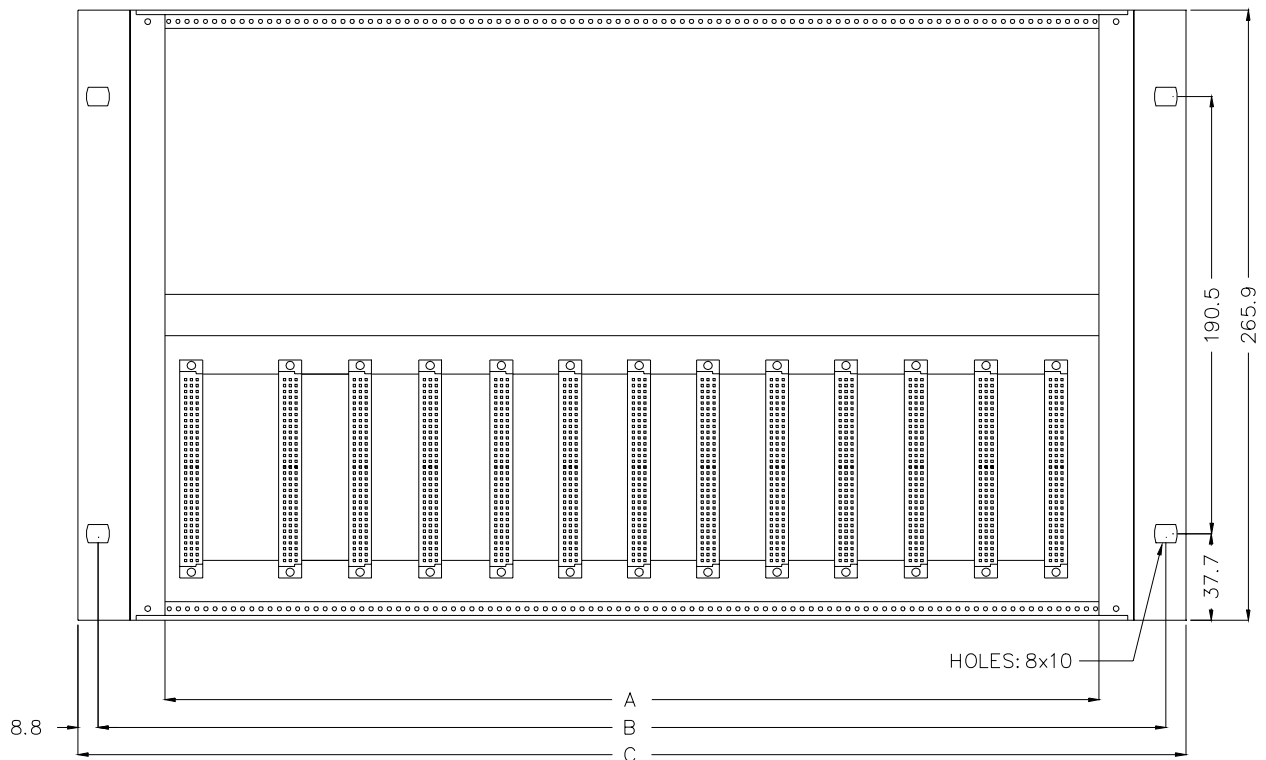
For further technical information about the special Delomatic modules, please refer to the specific data sheets. Please notice that the Delomatic modules are designed to operate as an integrated part of the Delomatic pack.

DEIF Generator Unit (DGU)

The rack is specially made for the Delomatic modules. A rack mounted with Delomatic modules is called a DEIF Generator Unit (DGU).

This type of rack frame is constructed according to BN 411002 and BN 411003 (BN = Bundesbahn Norm).

A communication bus consisting of a flat cable and a number of 64-terminal-connectors is located in the back plane of the rack. Each connector has a corresponding set of PCB guide rails.



The rack is produced in two different sizes; a rack with 84 TE and one with 60 TE available space for the Delomatic modules (the "A" dimension).

Dimensions of 84 TE rack: A = 426.7 mm, B = 465.1 mm, C = 483.0 mm, weight: 3.5 kg (7.7 lb)

Dimensions of 60 TE rack: A = 304.8 mm, B = 343.2 mm, C = 361.1 mm, weight: 3.0 kg (6.6 lb)

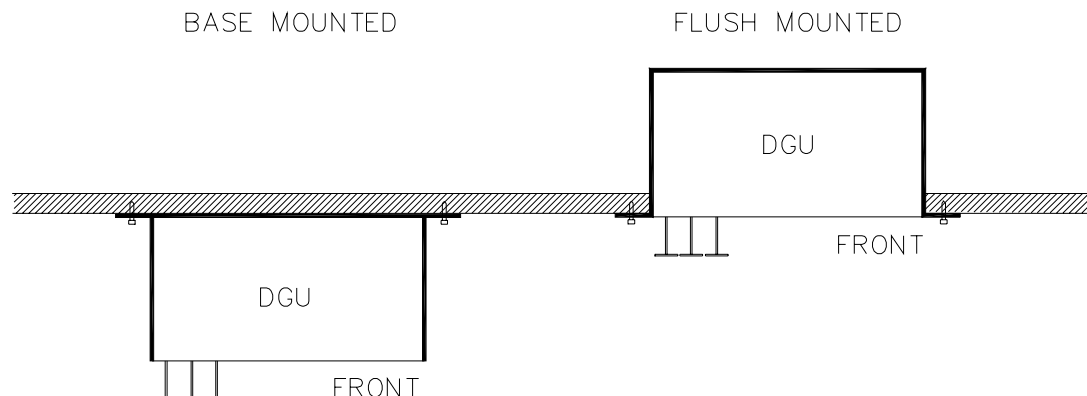
In some applications, e.g. marine applications, a vibration absorbent kit may be necessary. The weight of the rack is increased by the installation of a vibration absorbent kit.

Vibration absorbent kit for 84 TE rack: Weight: 1.2 kg (2.6 lb)

Vibration absorbent kit for 60 TE rack: Weight: 0.9 kg (2.0 lb)

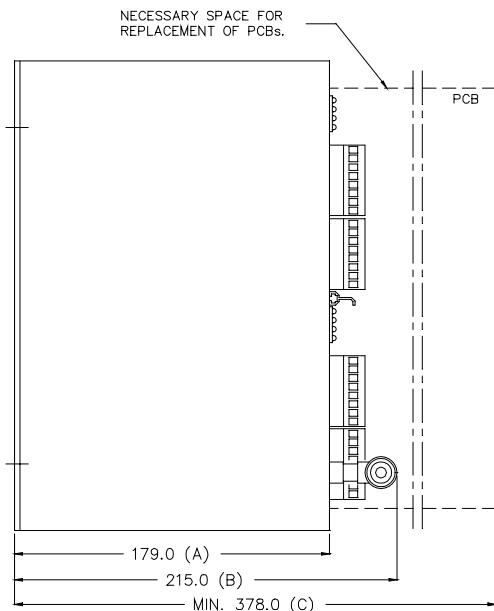
The Delomatic vibration absorbent kit is installed as a standard in racks for marine applications, and on request it may be installed in other types of applications e.g. power stations or CHP plants.

A base mount or flush mount option is available for both the 84 TE and the 60 TE racks.



When ordering the Delomatic system, please specify whether a rack for base mount or flush mount is wanted.

To maintain the protection class, non-used slots are mounted with cover plates.



Please notice the below practical precautions which should be respected during installation of the rack in order to avoid problems regarding the free space in front of the rack.

During operation the ARC-network connector must be clear of the front door of the cabinet.

Thus the distance from the back of the cabinet to the inside of the front door must be larger than specified (B) in the illustration to the left.

Likewise the distance from the back of the cabinet to any solid objects in front of the rack (with an open cabinet door) must be minimum as specified (C) in the illustration.

The above precautions are necessary in order to ensure sufficient working space during service or maintenance on the Delomatic system.

Flammability: All plastic parts are self-extinguishing according to UL94-VO.

Protection: IP20 (front and rear) when the rack is completely mounted with Delomatic modules or cover plates.

Approvals: The Delomatic system is CE marked and type approved by LR, GL, DNV, ABS, BV, RINA, CCS and CNK.

ARC-net

The function of the ARC-network is to enable the DGUs to communicate with each other and with their control panels. The ARC-network is to be connected to the CM and the CP.

The ARC-net is a Local Area Network (LAN) of token ring type. The cable is coaxial and supplied with BNC connectors. The maximum length of the network is 300 ms without repeaters and with a minimum of 1.8 ms between connections.

The network must be installed with only one (1) starting point and only one (1) ending point. Parallel strings are not allowed.

The network is to be supplied with noise reducing ferrit cores approx. 0.1 m before and after each BNC connector. All connections to the network is to be made through a T-plug and each end of the network is to be terminated with an end-terminator.

8 DGUs (CM-2 modules), 24 Control Panels (3 per DGU) and several other terminals (e.g. alarm systems or graphic presentation systems) may be connected on the same ARC-network.

Specifications of the coaxial cable:

Type: RG-62 A/U, 93 ohm, ø5 mm

Weight: 2.0 m cable complete with two connectors, T-plug, end-terminator
and two ferrit cores: 0.2 kg (0.4 lb)
1.0 m of straight coaxial cable without any connectors: 0.05 kg (0.1 lb)

Impedance: 93 Ω

Damping: 5.5 dB/300 m

Speed: 2.5 Mbit/sec.

Flammability: All plastic parts are self-extinguishing to UL94-VO.

Environment: Temperature: Nominal: -10...+55°C
Operational: -25...+70°C
Storage: -40...+70°C

Climate: Class HSE, to DIN 40040

Errors and changes excepted.



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