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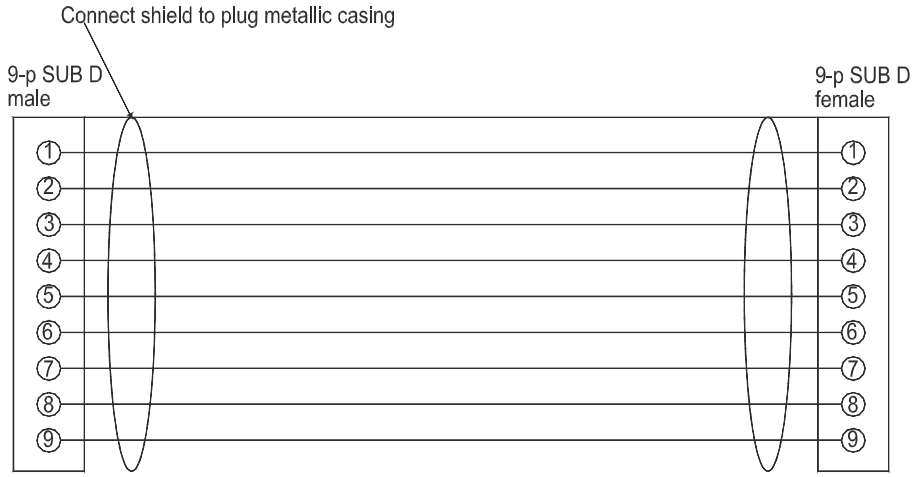
29. Technical specifications

DU and AOP

Operating temp.:	-25…70°C (-13...158° F)
Mounting:	Base mount with 6 screws
Climate:	Class HSE, to DIN 40040
Protection:	IP52 (IP54 with gasket: Option L) To IEC 529 and EN 60529
EMC/CE:	To EN 50081-1/2, EN 50082-1/2, SS4631503 (PL4) and IEC 255-3
Material:	All plastic materials are self-extinguishing according to UL94 (V1)
Max. number of units:	Max. 3 displays to one DM4 unit Max. 1 AOP-1 to each display
Galvanic separation:	To all other circuits: None To earth: None
Plug connections:	Port to DM4 unit: 9-pole Sub-D male Port to AOP-1: RJ45 Port to other display unit: DEIF 6-pole Modular Jack Plug (CAN bus port)
Cabling:	Between display and DM4 unit: DEIF monitor cord 3 m - 1022040042 6 m - 1022040043 Between two displays: DEIF 6-pole Modular Jack Plug 3 m - 1022040060 Max. length: 500 m Between display and AOP-1: DEIF AOP connection cord 0.5 m - 1022040059
External power supply:	The master display is supplied from the DM4 unit via the display cable. Additional displays connected via the display CAN bus port must be supplied by an external 5V DC power supply. DEIF external 24V DC to 5V DC converter (1030590001) can be used. It is galvanically separated.

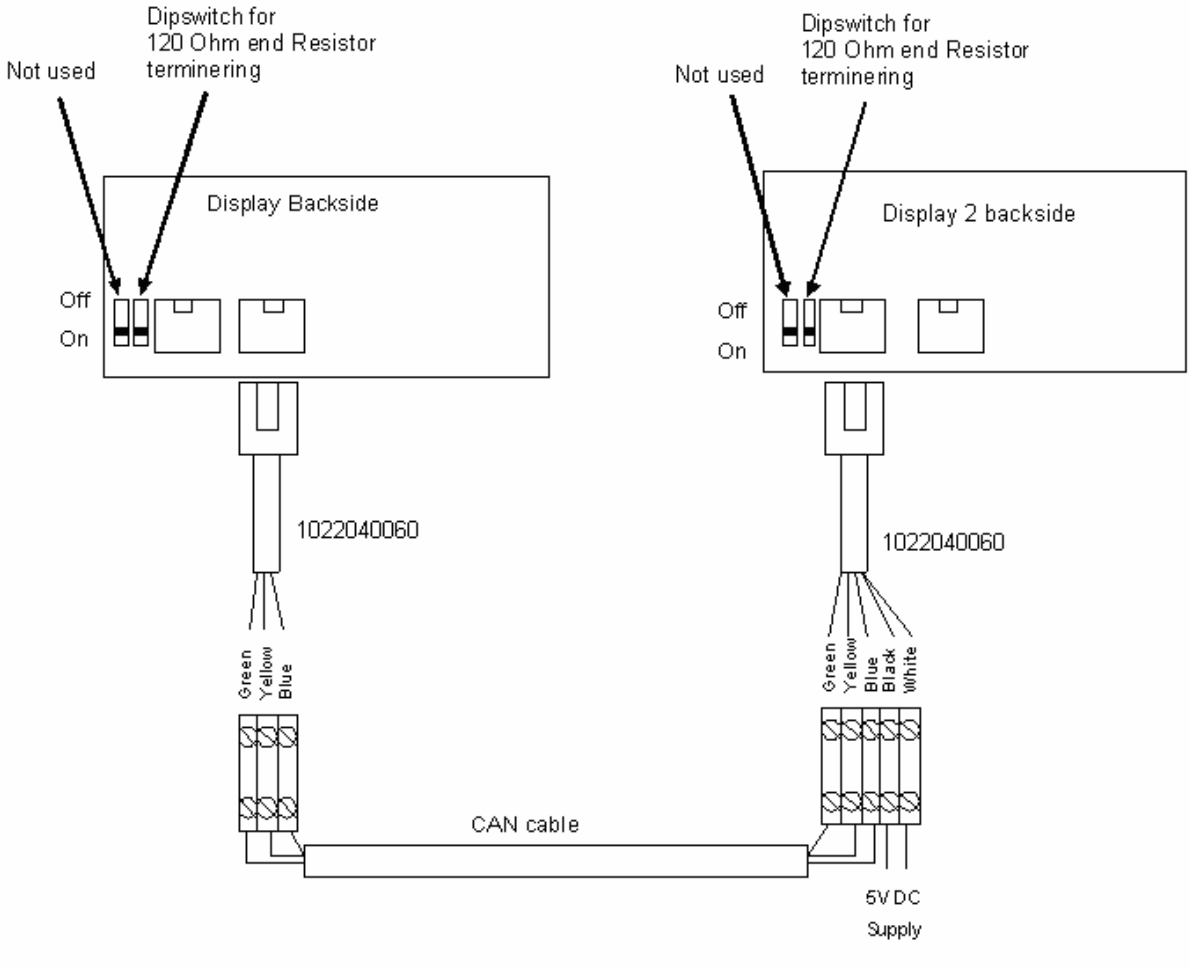
Display cabling (between DU 1 and DGU unit)

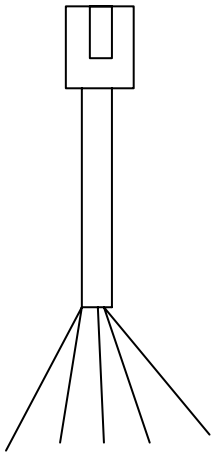
A standard computer extension cable can be used (9-pole SUB-D male/female plugs) or a cable can be tailored.



Wires min. 0.22 m^2, max. cable length 6 m.
Cable types: Belden 9540, BICC H8146, Brand Rex BE57540 or equivalent.

CAN bus cabling (between displays)

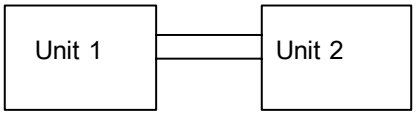




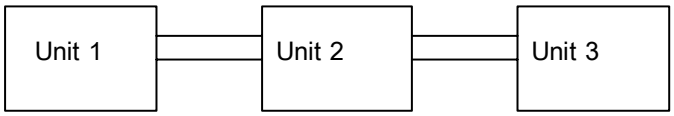
White GND
Black +5VDC
Red Not used
Green CAN L
Yellow CAN GND
Blue CAN H

End resistor on CAN bus

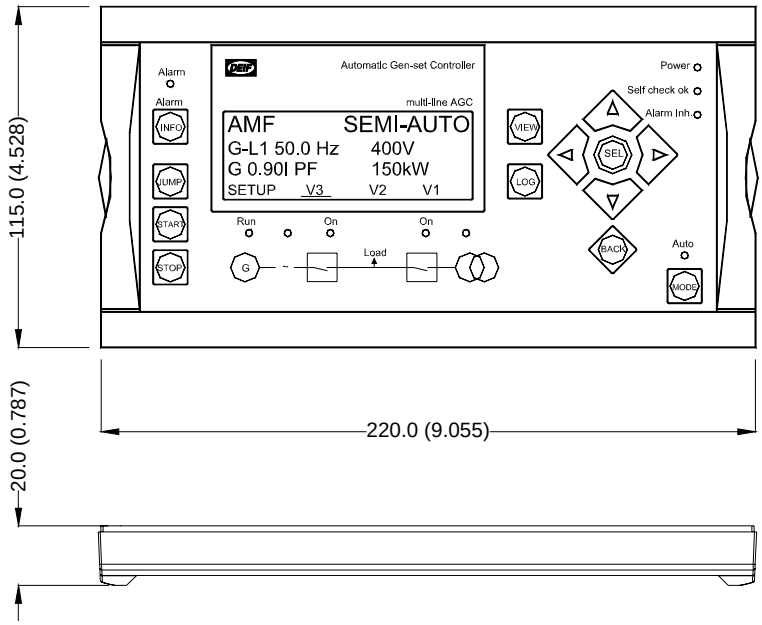
If two units are connected by CAN bus, the 120 Ohm DIP switch must be set to “ON” on both units.



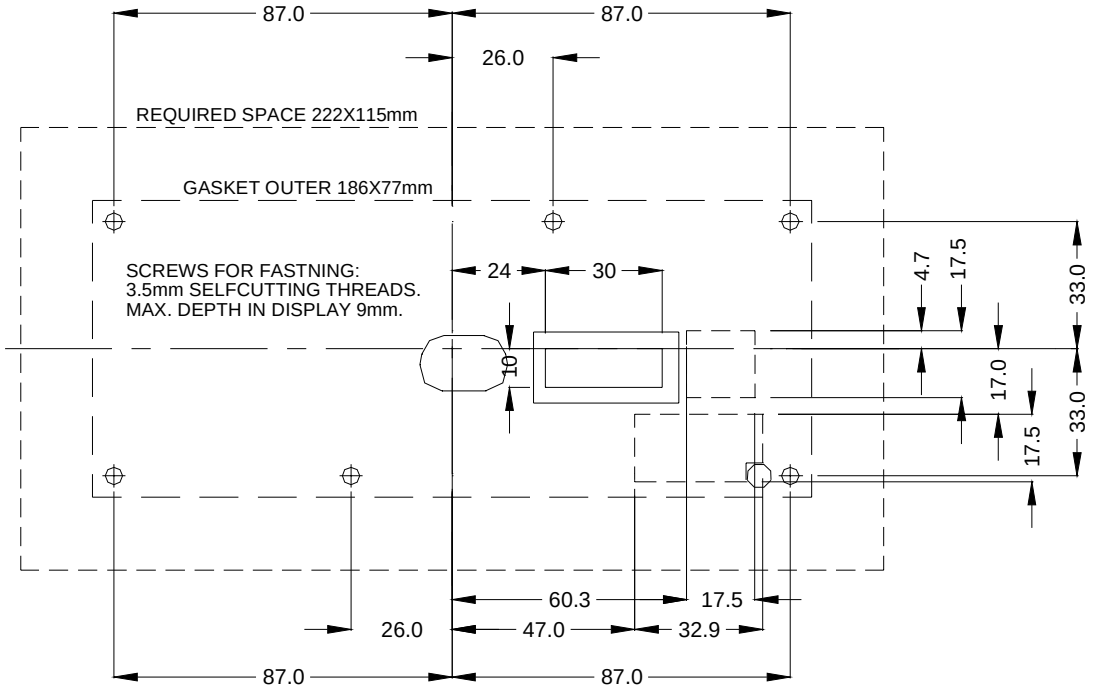
If three units are connected by CAN bus, the 120 Ohm DIP switch must be set to “ON” on unit 1 and unit 3. Unit 2 must be set to “OFF”.



Dimensions in mm (inches)



Cutout in mm (inches)



Panel cutout:
H x W = 10 (0.393") x 30 (1.181")

Display size:
H x W = 115 (4.528") x 220 (8.661")

Power Control Module 4.1

Dimension:	Width 40.7 mm (8 TE)
Power consumption:	Typical: 9W Max.: 25W
Temperature:	Reference: +15…+30°C Nominal: -10…+55°C Operational: -25…+70°C Storage: -40…+70°C
Climate:	Class HSE (to DIN 40040)
Safety:	To EN 61010-1, installation category (overvoltage category) III, 600V, pollution degree 2
Protection:	IP20 (to IEC 529 and EN 60529)
EMC/CE:	To EN 50081-1/2, EN 50082-1/2, SS4631503 (PL4) and IEC 255-3
Material:	All plastic materials are self-extinguishing according to UL94 (V1)

Power supply

The Power supply and Control Module (PCM) supplies the other DELOMATIC 4 modules with power. The PCM provides a galvanic insulation between the power source and the DELOMATIC 4 system.

The PCM is equipped with a switch mode power supply, which generates supply voltage for the control part of the PCM and for supply voltages to the other modules.

The total power consumption of the PCM depends on the configuration in the rack, as the modules have different power consumption.

Supply voltage: Nom. +24V DC (-25%/+30%)
The power is not turned off at an exact external voltage, it varies with the load
An external fast blowing fuse of 10A is recommended

Power OK LED: A GREEN LED indicates that the internal power supply is OK

- When the internal 5V DC power supply is OK, this LED is GREEN

An ORANGE LED indicates that the external power supply is too low

- When the external power supply is less than 18V, this LED is ORANGE

If there is no light in the LED, check if there is 24V DC on terminal 1-2

ARC NET OK LED: The LED marked "ARC NET OK" indicates activity on the ARC network

- If this LED is GREEN, there is activity on the ARC network

Galvanic separation: From supply voltage to all other circuits: 500V AC – 50Hz – 1min.
From supply voltage to earth (chassis): 500V AC – 50Hz – 1min.

Terminals: Spring cage plug-able connectors

Cabling: 0.2-2.5 mm^2 single/multi-stranded wire

Communication

The control part in the PCM module is the main controller in the DELOMATIC system. The PCM uses a lot of communication standards, which are described in the following.

LAN (ARC net)

The PCM carries out communication via the LAN (ARC net) to other DGUs. Maximum Baud rate at the ARC net is 2.5M Baud.

Galvanic separation: To all other circuits: 500V AC – 50Hz – 1min.
To earth (chassis): 500V AC – 50Hz – 1min.

Terminals: Spring cage plug-able connectors

Cabling: 2-wire twisted pair cable with shield. The cable must have a characteristic impedance of 120Ω. The shield of the cable is used as ground. End terminations of 120Ω should be used

Cable length (total):

Nodes	Max. length
4	243 m
8	213 m
16	152 m

LED: The green LED (LAN OK) is turned on, when there is communication on the ARC net

CAN 1

Communication speed: 125/250 kbit/sec.

Galvanic separation: To all other circuits: 500V AC – 50Hz – 1min.
To earth (chassis): 500V AC – 50Hz – 1min.

Terminals: Spring cage plug-able connectors

Cabling: 2-wire twisted pair cable with shield. The cable must have a characteristic impedance of 120Ω. The shield of the cable is used as ground. End terminations of 120Ω should be used

Cable length: Max. 500 m

CAN 2

Communication speed: 125/250 kbit/sec

Galvanic separation: To all other circuits: 500V AC – 50Hz – 1min.
To earth (chassis): 500V AC – 50Hz – 1min.

Terminals: Spring cage plug-able connectors

Cabling: 2-wire twisted pair cable with shield. The cable must have a characteristic impedance of 120Ω. The shield of the cable is used as ground. End terminations of 120Ω should be used

Cable length: Max. 500 m

CAN 3

CAN 3 is a spare CAN bus port.

Galvanic separation: To all other circuits: 500V AC – 50Hz – 1min.
To earth (chassis): 500V AC – 50Hz – 1min.

Terminals: Spring cage plug-able connectors

Cabling: 2-wire twisted pair cable with shield. The cable must have a characteristic impedance of 120Ω. The shield of the cable is used as ground. End terminations of 120Ω should be used

Cable length: Max. 500 m

RS485

PCM has RS485 2- or 4-wire, which can be selected with a jumper. RS485 is a Modbus RTU port from which an external system like M-Vision, PC or alarm system can poll data from DM4 and write commands to DM4. Maximum Baud rate is 9.6K Baud.

Galvanic separation: To all other circuits: 500V AC – 50Hz – 1min.
To earth (chassis): 500V AC – 50Hz – 1min.

Terminals: Spring cage plug-able connectors

Cabling: 2- or 4-wire twisted pair cable with shield. The cable must have a characteristic impedance of 120Ω. The shield of the cable is used as ground. End terminations of 120Ω should be used

Cable length: Max. 243 m

USB B

USB B is a peripheral unit, which is supplied from the unit that connects to it. USB B is used as service port for connection to DEIF utility PC software.

Galvanic separation: To all other circuits: 500V AC – 50Hz – 1min.
To earth (chassis): 500V AC – 50Hz – 1min.

Terminals: Standard USB B I/O

Cabling: Standard USB cable (max. 3-5 m)

USB A

USB A ports are spare ports. (Not yet supported by SW).

Galvanic separation:	To all other circuits:	500V AC – 50Hz – 1min.
	To earth (chassis):	500V AC – 50Hz – 1min.
Terminals:	Standard USB A I/O	
Cabling:	Standard USB cable (max. 3-5 m)	

Ethernet

Ethernet at PCM is a standard 10Mbit/100MHz connection. This is a spare port.

Galvanic separation:	To all other circuits:	500V AC – 50Hz – 1min.
	To earth (chassis):	500V AC – 50Hz – 1min.
Terminals:	Standard RJ45 I/O	
Cabling:	Standard RJ45 cable. Straight through cable is used when connecting to e.g. a switch. Use a crossover cable if connecting directly to a PC	

Display port

The display port is to connect a DM4 display, from which read-outs and settings can be made.

Galvanic separation:	To all other circuits:	None, it is a part of the main circuit
	To earth (chassis):	500V AC – 50Hz – 1min.
Terminals:	Standard female D-sub-9	
Cabling:	DEIF monitor cord (3 m - 1022040042, 6 m - 1022040043)	

Input/output

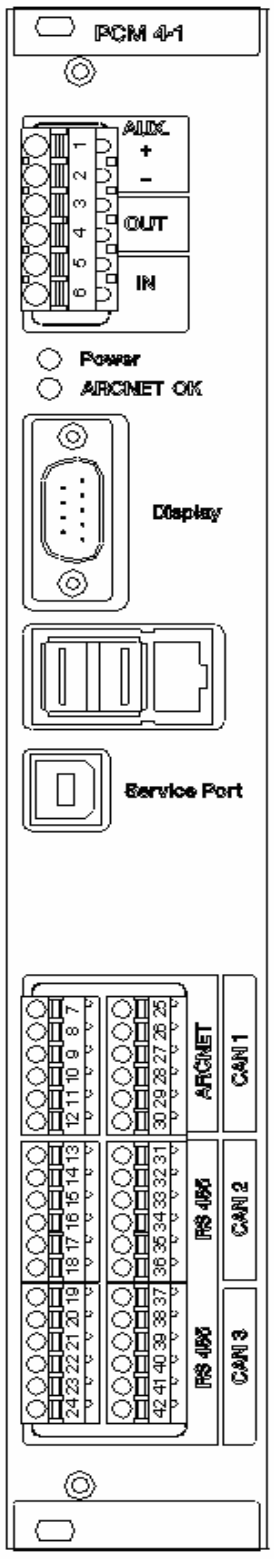
The PCM is further equipped with one binary input and one relay output.

The input can be used to notify PCM 4.1, if another system working with DM4 is working correctly.

The relay output is a “Status” output, which indicates if the power supply or a system failure has occurred. The relay has closed contact (coil energized) when the status of the system is OK, and open contact when a system failure or a power supply failure has occurred.

Input:	1 binary input designed for potential free contacts Open/closed: 12V/7.5mA		
	Galvanic separation:	To all other circuits:	None
		To earth (chassis):	500V AC – 50Hz – 1min.
Relay output:	Relay rating:	250V AC/24V DC – 8A	
	Galvanic separation:	To all other circuits:	2.0KV AC – 50Hz – 1min.
		To earth (chassis):	2.0KV AC – 50Hz – 1min.
Terminals:	Spring cage plug-able connectors. 0.2-2.5 mm^2 single/multi-stranded wire		

Connection overview



USB A/USB A/Ethernet

USB B

7 - ARCnet PH-A
8 - ARCnet GND
9 - ARCnet PH-B
10 - ARCnet PH-A
11 - ARCnet GND
12 - ARCnet PH-B

13 - RS485 RxA-A
14 - RS485 GND
15 - RS485 RxB-B
16 - RS485 TxA
17 - RS485 GND
18 - RS485 TxB

19 - RS485 RxA-A
20 - RS485 GND
21 - RS485 RxB-B
22 - RS485 TxA
23 - RS485 GND
24 - RS485 TxB

25 - CAN 1 H
26 - CAN 1 GND
27 - CAN 1 L
28 - CAN 1 H
29 - CAN 1 GND
30 - CAN 1 L

31 - CAN 2 H
32 - CAN 2 GND
33 - CAN 2 L
34 - CAN 2 H
35 - CAN 2 GND
36 - CAN 2 L

37 - CAN 3 H
38 - CAN 3 GND
39 - CAN 3 L
40 - CAN 3 H
41 - CAN 3 GND
42 - CAN 3 L

Only 1 RS485 port is available, even though there are 2 sets of terminals (internally connected).

(Communications are connected straight forward except for RS485 4-wire, where RxA goes to TxA, RxB goes to TxB, TxA goes to RxA and TxB goes to RxB).

IOM 4.1

Dimension:	Width 30.5 mm (6 TE)
Supply:	From PCM module via the backplane
Power consumption:	Typical: 2W Max.: 6W
Temperature:	Reference: +15…+30°C Nominal: -10…+55°C Operational: -25…+70°C Storage: -40…+70°C
Climate:	Class HSE (to DIN 40040)
Safety:	To EN 61010-1, installation category (overvoltage category) III, 600V, pollution degree 2
Protection:	IP20 (to IEC 529 and EN 60529)
EMC/CE:	To EN 50081-1/2, EN 50082-1/2, SS4631503 (PL4) and IEC 255-3
Material:	All plastic materials are self-extinguishing according to UL94 (V1)

16 input channels

The IOM 4.1 contains 16 input channels, which may be individually configured as a current input (0...20mA), a voltage input (0…10V) or as a binary input (CC/OC). Live zero (offset) of the analogue inputs (e.g. 2…10V or 4…20mA) is available through the application program. The input channel configuration (analogue/binary) must correspond to the input definitions in the application program (in the PCM).

The status of the binary input is detected by an active voltage level detector circuit in the IOM 4.1, which may be connected to a potential free contact only.

All “COM” terminals are in all three configurations connected to the internal ground. Cable supervision is optional for channels configured as binary input.

Measurement:	Accuracy:	Class 1 (to IEC 688)
	Resolution:	10bit (0.1% of full scale)
Impedance:	mA - input:	50Ω
	V - input:	15KΩ
	Binary input:	Max. resistance for ON detection: 100Ω
	Resistance for cable supervision:	270Ω +/-10%
Galvanic separation:	No galvanic separation to internal ground Between inputs and earth (chassis): 500V AC – 50Hz – 1 min.	
Terminals:	Spring cage plug-able connectors. 0.14-1.5 mm^2 single/multi-stranded wire	

12 relay output channels

The IOM 4.1 contains 12 relay outputs with programmable active position. The active position may be a Closed Contact (CC) or an Open Contact (OC), dependent on the output channel setup in the application program (in the PCM). The relay position is a Closed Contact with an energized coil.

All relay outputs are potential free contacts, and each output is galvanically insulated from the DELOMATIC system.

If a power supply or system failure appears, all relay outputs are set to an Open Contact position (OC).

Contact ratings:	Max.: 250V AC/24V DC, 8A	
Galvanic separation:	Between relay contacts and other circuits:	2.0KV AC – 50Hz – 1min.
	Between different relay contacts:	2.0KV AC – 50Hz – 1min.
	Between relay contacts and earth (chassis):	2.0KV AC – 50Hz – 1min.
Terminals:	Spring cage plug-able connectors. 0.2-2.5 mm^2 single/multi-stranded wire	

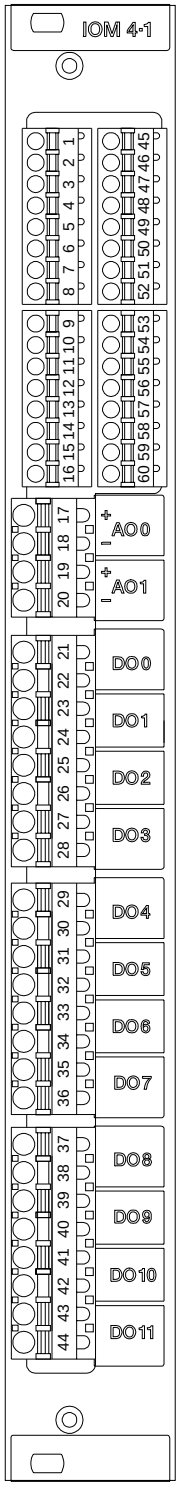
2 analogue output channels

The IOM 4.1 contains 2 analogue outputs (0...20mA), both galvanically separated. Live zero (offset) of the analogue outputs (e.g. 4...20mA) is available through the application program (in the PCM).

If a power supply or system failure appears, both analogue output channels are set to zero output (0mA).

Output:	0…20mA	
Load:	Max. 500Ω	
Accuracy:	Class 0.5 (to IEC 688)	
Resolution:	10bit (0.1% of full scale)	
Galvanic separation:	Between analogue outputs and other circuits:	500V AC – 50Hz – 1min.
	Between two analogue outputs:	500V AC – 50Hz – 1min.
	Between analogue outputs and earth (chassis):	500V AC – 50Hz – 1min.
Terminals:	Spring cage plug-able connectors. 0.2-2.5 mm^2 single/multi-stranded wire	

Connection overview



SCM 4.1

Dimension:	Width 30.5 mm (6 TE) (SCM 4·1)
Supply:	From PCM module via the backplane
Power consumption:	Typical: 2W Max.: 3W
Temperature:	Reference: +15…+30°C Nominal: -10…+55°C Operational: -25…+70°C Storage: -40…+70°C
Climate:	Class HSE (to DIN 40040)
Safety:	To EN 61010-1, installation category (overvoltage category) III, 600V, pollution degree 2
Protection:	IP20 (to IEC 529 and EN 60529)
EMC/CE:	To EN 50081-1/2, EN 50082-1/2, SS4631503 (PL4) and IEC 255-3
Material:	All plastic materials are self-extinguishing according to UL94 (V1)

3-phase multi-transducer

The SCM 4·1 has one 3-phase current input and two 3-phase voltage inputs.

From these inputs all relevant values are measured and calculated.

Measurement:	True RMS	
	Accuracy:	Class 0.5 (to IEC 688)
	Frequency:	30…70Hz
	Harmonics:	Max. 500Hz are measured and included in the results and calculations
Voltage:	Range:	100…690V AC +/-20% (phase-phase)
	Dynamic area:	0…135% (sine wave)
Load:	Max. 0.25VA/phase (1MΩ/phase)	
Galvanic separation:	To all other circuits: 3250V AC – 50Hz – 1min. To earth (chassis): 3250V AC – 50Hz – 1min.	
Terminals:	Spring cage plug-able connectors. 0.2-2.5 mm^2 single/multi-stranded wire	
Current:	Range:	-/1A or -/5A AC
	Dynamic area:	0…400% (sine wave)
Load:	Max. 0.25VA/phase	
Max. overcurrent:	4 x I_n continuously 20 x I_n, 10 sec. (max. 75A) 80 x I_n, 1 sec. (max. 300A)	

Galvanic separation: To all other circuits: 3250V AC – 50Hz – 1min.
To earth (chassis): 3250V AC – 50Hz – 1min.

Terminals: Plug-able screw connection. 0.2-4.0 mm^2 single/multi-stranded wire

Breaker handling

The generator breaker position is supervised by a feedback signal from the generator breaker. The ON/OFF control is carried out via 2 potential free relay outputs.

Feedback: 2 binary inputs designed for potential free contacts
Open/closed: 12V/7.5mA

2 green LEDs for indication of feedback signal

Galvanic separation: To all other circuits: 500V AC – 50Hz – 1min.
To earth (chassis): 500V AC – 50Hz – 1min.

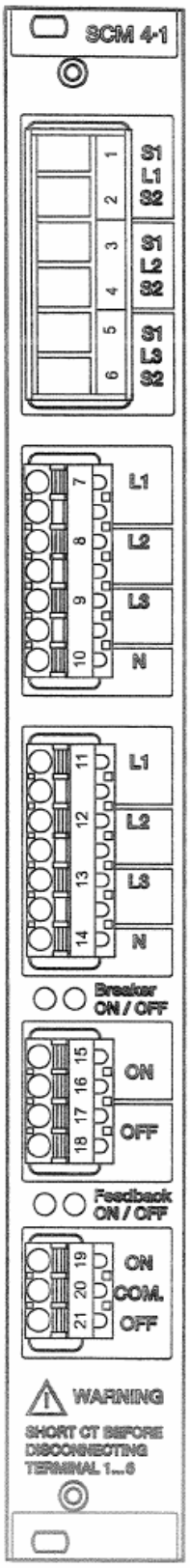
ON/OFF signals: 2 relay outputs
Relay rating: 250V AC/24V DC – 8A

2 yellow LEDs for indication of ON/OFF signals

Galvanic separation: To all other circuits: 2.0KV AC – 50Hz – 1min.
Between relays: 2.0KV AC – 50Hz – 1min.
To earth (chassis). 2.0KV AC – 50Hz – 1min.

Terminals: Spring cage plug-able connectors. 0.2-2.5 mm^2 single/multi-stranded wire

Connection overview



SCM 4.2

Dimension:	Width 60.96 mm (12TE) (SCM 4·2)
Supply:	From PCM module via the backplane
Power consumption:	Typical: 2W Max.: 3W
Temperature:	Reference: +15…+30°C Nominal: -10…+55°C Operational: -25…+70°C Storage: -40…+70°C
Climate:	Class HSE (to DIN 40040)
Safety:	To EN 61010-1, installation category (overvoltage category) III, 600V, pollution degree 2
Protection:	IP20 (to IEC 529 and EN 60529)
EMC/CE:	To EN 50081-1/2, EN 50082-1/2, SS4631503 (PL4) and IEC 255-3
Material:	All plastic materials are self-extinguishing according to UL94 (V1)

3-phase multi-transducer

The SCM 4·2 has one 3-phase current input and two 3-phase voltage inputs.

From these inputs all relevant values are measured and calculated.

Measurement:	True RMS Accuracy: Class 0.5 (to IEC 688) Frequency: 30…70Hz Harmonics: Max. 500Hz are measured and included in the results and calculations
Voltage:	Range: 100…690V AC +/-20% (phase-phase) Dynamic area: 0…140% (sine wave)
Load:	Max. 0.25VA/phase (1MΩ/phase)
Galvanic separation:	To all other circuits: 3250V AC – 50Hz – 1min. To earth (chassis): 3250V AC – 50Hz – 1min.
Terminals:	Spring cage plug-able connectors. 0.2-2.5 mm^2 single/multi-stranded wire
Current:	Range: -/1A or -/5A AC Dynamic area: 0…400% (sine wave)
Load:	Max. 0.25VA/phase
Max. overcurrent:	4 x I_n continuously 20 x I_n, 10 sec. (max. 75A) 80 x I_n, 1 sec. (max. 300A)

Galvanic separation: To all other circuits: 3250V AC – 50Hz – 1min.
To earth (chassis): 3250V AC – 50Hz – 1min.

Terminals: Plug-able screw connection. 0.2-4.0 mm^2 single/multi-stranded wire

Breaker handling

The generator breaker position is supervised by a feedback signal from the generator breaker. The ON/OFF control is carried out via 2 potential free relay outputs.

Feedback: 2 binary inputs designed for potential free contacts
Open/closed: 12V/7.5mA

2 green LEDs for indication of feedback signal

Galvanic separation: To all other circuits: 500V AC – 50Hz – 1min.
To earth (chassis): 500V AC – 50Hz – 1min.

ON/OFF signals: 2 relay outputs

Relay rating: 250V AC/24V DC – 8A

2 yellow LEDs for indication of ON/OFF signals

Galvanic separation: To all other circuits: 2.0KV AC – 50Hz – 1min.
Between relays: 2.0KV AC – 50Hz – 1min.
To earth (chassis): 2.0KV AC – 50Hz – 1min.

Terminals: Spring cage plug-able connectors. 0.2-2.5 mm^2 single/multi-stranded wire

Connection overview