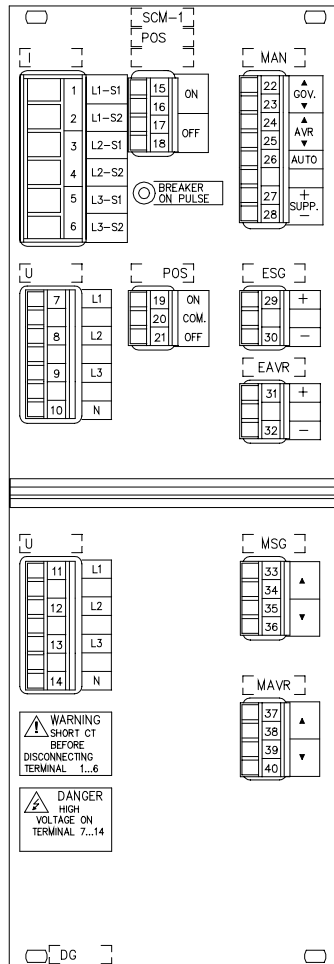


Delomatic – Multi-function system

Data SCM-1, Synchronizing/Measuring Module

4921240056E



SCM-1, Synchronizing / Measuring Module:

- **Designed with multi-transducer and synchronizer as well as protection functions**
- **Control of speed governor and AVR is supported by relay or analogue signals**

Synchronizing/Measuring Module (SCM-1)

The Synchronizing/Measuring Module (SCM) is a multi-functional module which consists of a synchronizer, a generator breaker control unit and a multi-transducer unit. One SCM-1 can control one generator set with regard to frequency/active power control (speed control), breaker ON/OFF control and voltage/reactive power control, generator protection ($I>$, $P>$ and $-P>$) and busbar supervision ($U_{BB>}$, $U_{BB<}$, $f_{BB>}$ and $f_{BB<}$).

Specifications for the synchronizer:

The synchronizer operates according to settings received from the Control Module (the operator can change the settings via the Control Panel).

The synchronization is carried out as a dynamic synchronization with regard to:

- Δ frequency: synchronization is always carried out over-synchronous with regard to a programmable nominal frequency, so that the engine takes load immediately when connected to the busbar.
- Δ voltage: the connection to the busbar will take place only if the difference between the voltage on the busbar and the generator voltage is less than a programmable Δ voltage value.
- Δ angle: the connection to the busbar will take place only when there is coherent phase angle between the busbar voltage and the generator voltage with regard to the generator breaker closing time (programmable).

The frequency/power (engine speed) and/or generator voltage are controlled by PI regulators, which operate according to the measured frequency/power and voltage/reactive power. The outputs from the PI regulators are connected to analog outputs for electronic speed governor (ESG) and electronic voltage regulator (EAVR). Separate relay outputs for Mechanical Speed Governors (MSG) and Mechanical Voltage Regulators (MAVR) can be installed in the SCM-1. The frequency/power (engine speed) and/or generator voltage may be manually controlled via incr./decr. inputs on the SCM-1 module.

Technical specifications for the synchronizer:

Synchronization:	Accuracy:	$\pm 5^\circ$ el.
	Frequency range:	45...65 Hz
Electronic outputs:	Analog output:	-20...0...+20mA, max. 5V DC. If voltage output is needed, 0...5V DC can be achieved by paralleling the circuits with a 250 Ω resistor.
Mechanical outputs:	Potential-free contact sets:	
	Max. ratings:	AC: 250V – 5A – 1000VA DC: 250V – 1A – 50W
		If PILOT MOTOR is AC, a noise reduction capacitor (0.1 μ F X-capacitor or equal) <u>must</u> be paralleled with motor terminals. If PILOT MOTOR is DC, a noise reduction capacitor (0.1 μ F, tranzorber or equal) <u>must</u> be paralleled with motor terminals.
IMPORTANT!		Only speed droop governors may be used in connection with the SCM-1 synchronizer unit.

Specifications for the breaker control unit

The generator breaker position is supervised by a two-terminal feedback input signal from the generator breaker.

The ON/OFF control is carried out via 2 potential-free relay outputs.

Technical specifications for the breaker ON/OFF control unit:

ON/OFF signal:	Potential-free contact sets:	
	Max. ratings:	AC: 250V – 5A – 1000VA DC: 250V – 1A – 50W
Pos. feedback:	Binary inputs:	Potential-free contacts.

Specifications for the multi-transducer unit

The multi-transducer unit has one 3-phase current input and two 3-phase voltage input.

From these inputs U_{L1-L2} , U_{L1-L3} , U_{L2-L3} , U_{L1} , U_{L2} , U_{L3} , I_{L1} , I_{L2} , I_{L3} , f_{GEN} , f_{BUSBAR} , S_{GEN} , P_{GEN} , Q_{GEN} and PF are measured or calculated.

The calculated and measured results are transmitted via the Delomatic communication bus to the Control Module (CM).

Technical specifications for the multi-transducer unit in the SCM-1:

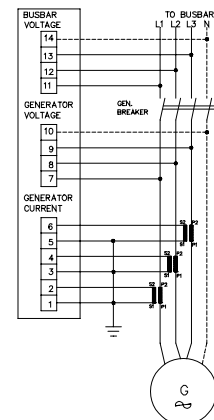
Measurement:	Accuracy:	Class 1 according to IEC 688 (-10... <u>15</u> ...+55°C)	
	Frequency range:	40...70 Hz	
	Harmonics:	Max. 500 Hz are measured and included in the results and calculations.	
Current:	3-phase current:	-/1 or -/5 A. Crest factor: Max. 6. The international current transformer has a burden of typ. 0.3VA for each phase. Selection of CT ratio (-/1A or -/5A) of the internal current transformer are made in the application program.	
	Overload ratings:	10A continuously, ≤ 75A for 10 s, ≤ 300A for 1 s.	
Voltage:	Voltage range:	Low:	100...200V AC ± 20% (phase-phase)
		Medium:	201...379V AC ±20% (phase-phase)
		High:	380...690V AC ± 20% (phase-phase)
		Crest factor:	Max. 1.5
		The internal voltage measuring circuit has a burden of max. 0.5VA for each phase. Selection of Low, Medium or High voltage range are made by means of jumpers on the PCB.	
	External fuse:	Max. 2A. Slow blow fuse.	
	Overload ratings:	2 x U _N for 10 s.	
Dimension:		Width 91.4 mm (18 TE)	
Weight:		1.25 kg (2.8 lb)	
Supply:		From the PSM-1 via the back plane and the "SUPP" connector.	
"SUPP" connector:		Nominal 24V DC +30%, -25% (including peak-peak ripple)	
	External fuse:	Max. 2A. Slow blow fuse.	
Power consumption:	Back plane:	Typ. 2.0W. Max. 3.0W.	
	"SUPP":	Typ. 2.0W. Max. 4.0W.	
Protection:		The "SUPP" connection is internally protected against voltage surges and transients. The nominal supply voltage may thus under no circumstances exceed 32V DC.	
LED:		<u>Red</u> LED "BREAKER ON PULSE" when the generator breaker ON pulse is sent.	
Galvanic separation:	Test voltage:	2.5kV/2.0kV/1.0kV – 50 Hz – 1 min. according to GL, LR and DNV.	
Screw terminals:	Current input:	4 mm ² (single/multi-stranded)	
	All others:	2.5 mm ² (single/multi-stranded)	
Flammability:		All plastic parts are self-extinguishing according to UL94-VO.	
Environment:	Temperature:	Reference:	+15...+30°C
		Nominal:	-10...+55°C
		Operational:	-25...+70°C
		Storage:	-40...+70°C
Climate:		Class HSE, according to DIN 40040.	
Protection:		IP20 when mounted in a Delomatic rack.	
Approvals:		The Delomatic system is CE marked and type approved by LR, GL, DNV, ABS, BV, RINA and CNK.	

AC measuring inputs

Please note: Max. input voltage is 690V AC.
Higher voltages require voltage measuring transformers.

Wiring shown is 4-wire with neutral.

If wiring is 3-wire without neutral, terminals 10 and 14 are left unused.



Errors and changes excepted.



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