



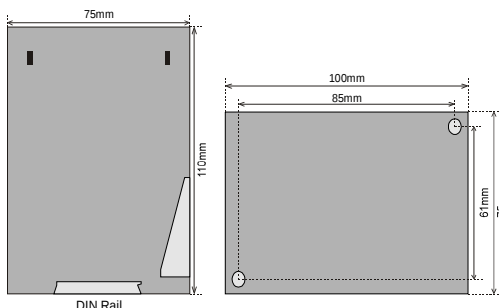
- Synchronising
- Load Sharing Control
- Frequency Control
- Soft Unload Control
- Fixed export control or “Peak Shaving”
- Easy “Do It Yourself” system

Specifications

System Voltage:	100-120, 200-240, 380-415 or 440-460VAC 50/60Hz (Fuse 0,5A)
Control Voltage:	24VDC as standard, 12 or 48VDC is available
Contact Rating:	AC: 100VA - 250V/2A max. DC: 50W - 100V/1A max.
Adjustments	
Pulse rate:	min 13-20 p.p.m. / max 54-84 p.p.m.
Pulse length:	100mS +/-30mS to 1,6secs +/-0,3secs
Frequency trim:	+/-1,5 - 2,5Hz
Load trim:	Up to +/- 50%
Inputs	
Power I/P:	-1/0/+10mA (from kW Transducer)
Synchronising I/P:	-10/0/+10mA (from KSQ104x/KCQ104x)
Outputs	
Total power:	0-5mA
Surplus power:	0-5mA
Temperature:	-20 to +70°C
Weight:	0.6kgs
Front protection:	IP21

Unit meets IEC60092-504 and relevant environmental and EMC tests specified in IEC60068/60092 and IEC61000/60533 respectively, to comply with Classification Societies requirements.

Dimensions



General Description

The MCE105D can be used to get synchronizing and frequency/load sharing control of single or several parallel generators. It can also be used to export kW to mains or for Peak Shaving applications.

The MCE105D Generator controller provides potential free relay output commands to regulate the fuel supply to a diesel engine to control the frequency, synchronization or load sharing of a generator.

It forms the basis of the Megacon MXG105 Generator Control System and operates in conjunction with the new KSQ104x / KCQ104x (or old KSQ105) automatic synchronizer.

It should be noted that the MXG105 system will only provide load sharing control on generators with speed droop facilities, but it can do load sharing to a fixed shaft generator or to mains supply.

Functional Description

Frequency Control

The frequency of the generator is compared to an internal frequency reference. Each MCE105D has its own frequency reference so there is no need to select a master generator. All online generators act in unison, ensuring the quickest possible response to frequency variation.

Synchronization

In synchronising mode the unit receives a frequency deviation signal (mA) from KSQ104x / KCQ104x (or old KSQ105).

The controller responds to this signal by giving raise/lower commands to incoming machine's speed control unit. The KSQ104x or KCQ104x will give the closing pulse to breaker when generator is within set limits.

Functional Description

Load Sharing

When a generator is synchronised to the bus, a generator circuit breaker auxiliary switch applies a DC voltage to close the internal load balance relay in the MCE105D. The load sharing line output signal must also be connected (in parallel) to other MCE105D online units.

In load sharing mode the unit receives a kW analogue signal proportional to the generator load from a power transducer (Megacon type MCxWx, MAG10x, KPW17x or similar kW transducer).

To allow for machines of different ratings, the kW signal is recalibrated within the MCE105D to give the load balance signals an equal scale factor. This calibration is normally factory set but provision is made for fine adjustment of the load sharing during commissioning.

Changes in system load will cause the MCE105D controller to adjust the fuel supply to engine, each engine adjusting by its percentage share of the increased or decreased load. Concurrently, compensation is made for minor variation in system frequency, ensuring fast, smooth and reliable operation.

Note that in a MXG105 system there is no master generator setting, therefore **hunting** due to the delayed effect of **cascaded** controls will not occur.

In kW mode a 5kohm potmeter is connected to give a fixed generator power into the mains system. This generator power export is maintained regardless of variations of mains frequency. In this application the generator is both loaded and unloaded gradually by adjustment of the rate of change is made by altering the pulse rate and with control potmeters.

Interface to Diesel

The MCE105D is provided with Raise/Lower potential free relay outputs to operate directly to a motorised governor. Some newer electronic regulators also have digital inputs for speed regulation.

Should the speed regulator require an analogue signal then an electronic potentiometer of type MXR845CI2x or MXR845DI2 can be used as interface.

This DIN rail mounted potentiometer has a DC voltage or DC mA output with adjustable span, offset and ramp rate to enable it to be set up to interface to most electronic speed control units.



MXR845x2

Load Output Signals

There are two analogue output signals available from each MCE105D controller. These are referred to as **Generator Output Power** and **Generator Surplus Power**.

These signals are normally calibrated to the same scale factor and can therefore be summated to give analogue output signal proportional to **Total Generator Power** and **Surplus System Power**.

The resultant signals may be used as inputs to indicators or to an analogue level instrument for load dependent start/stop, or load blocking function.

Mode Control

The various modes of control are selected by applying 24VDC to one of the mode control inputs (term. 16, 17, 18, or 20).

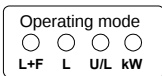
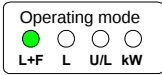
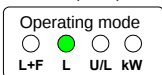
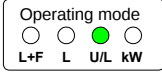
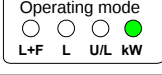
Details of the switching sequences are described on page 3.

The MEGACON policy is one of continuous improvement, consequently equipment supplied may vary in detail from this publication.

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Connection Description

Terminal(s)	Connection	Comments
1, 3	Generator AC	This is either line to line voltage or line to neutral voltage. Refer to the unit's test certificate or information label for supply voltage
7, 8, 9	Set kW pot.	An external 5kohm pot. For setting a kilowatt level for applications of generators synchronised to the mains. (see information on terminal 20)
12, 13, 14	Speed Control	Can be directly connected to systems that accept volt free raise/lower signals. Connected to MXR845Clx or MXR845Dlx electronic potentiometer for applications that require interfacing into speed controls that require a voltage signal.

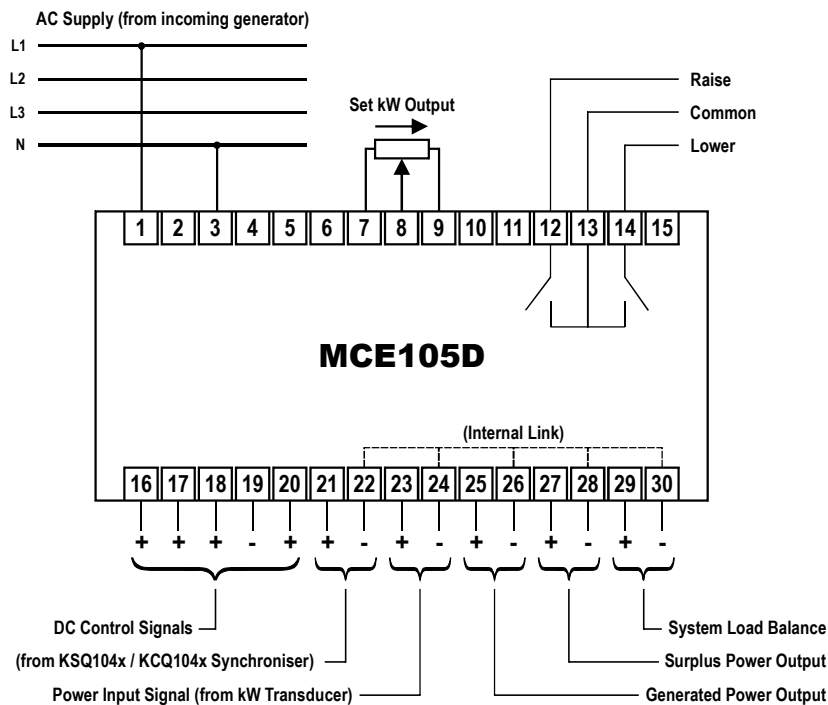
DC Control Signals		
19 (-ve)	Control signal common	Common negative feed for control signals
NOTE: Only one Control signal should be connected at any time.		
	Synchronising Mode	With NO DC control signals applied the synchronising mode is selected.
	Frequency Control and Load Sharing Control	With a positive 24VDC applied, the load sharing and frequency control are activated. The «L+F» LED being illuminated indicates this. On "Island Mode" applications, this would be connected to an auxiliary contact on the generator breaker. NOTE: Under the LID there is a switch to select either 50 or 60Hz as nominal speed (see page 4)
	Load Sharing Control only	With a positive 24VDC applied, only the load sharing control is activated. The «L» LED being illuminated indicates this. On "peak lopping" applications, this would be connected to auxiliary contacts of both the generator breaker and the mains breaker.
	Soft Unload	With a positive 24VDC applied, the load sharing and frequency controls are overridden. The unit will lower the kilowatt loading on the generator to zero. The «U/L» LED being illuminated indicates the operational mode. This is normally connected to an unload switch or timer.
	Constant Power Output	With a positive 24VDC applied, the unit will increase the kilowatt loading on a generator to a fixed percentage set by an external 5kohm potentiometer connected to terminals 7,8, & 9. This is used on export to mains applications where the generator is synchronised to the mains and a fixed export amount is required.

Analogue Signals		
21, 22	Synchroniser Input	Input from synchroniser type KSQ104x (DIN96) or KCQ104x (DIN-rail) (or old KSQ105). Bi-directional -10/0/+10mA signal.
23, 24	Power Transducer Input	Input from any kW Power Transducer. Signal: -1/0/+10mA signal 23 (+ve) 24 (-ve)
25, 26	Generated Power Output	Output scaled for use with KPM13M15x Level Controller. 25 (+ve) 26(-ve)
27, 28	Surplus Power Output	Output scaled for use with KPM13M15x Level Controller. 27 (+ve) 28 (-ve)
29, 30	Load Sharing Line	Wired in parallel, positive to positive and negative to negative, with all other paralleled generators in the system.

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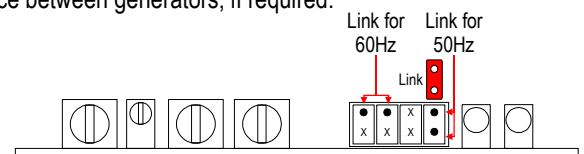
Connection Description



NOTES:

1. The use of screened cable is recommended for all connections to the instrument.
2. A load trimpot on the front of the instrument allows adjustment of the load balance between generators, if required.
3. A frequency trimpot on the front of the instrument is available for fine adjustment of the system frequency. The system frequency can be changed between 50 and 60Hz via a link mounted behind the front lid on the top pcb as shown right:
4. The pulse rate and pulse length of the raise/lower output contacts can be adjusted from the front of the instrument for optimum system response.
5. Terminals 22, 24, 26, 28 and 30 are internally linked to signal common (C), and should not be grounded to battery negative.
6. Applying a positive 24VDC signal between the following terminals and terminal 19 (negative) will change the mode of operation of the instrument as below:

No signal	= Synchronising mode
Terminal 16	= Load Balance & Frequency Control
Terminal 17	= Load Balance Control only
Terminal 18	= Soft Unload
Terminal 20	= Constant Power Output (set by an external 5kohm potentiometer connected to terminals 7, 8 & 9). Used only in synchronise to mains/utility applications.



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ORDERING EXAMPLE:

Type : MCE105D
AC Aux. Supply : 230VAC

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