

Digital Synchronizer and Load Control (DSLCTM)



APPLICATION

The Woodward DSLCTM control is a microprocessor-based synchronizer and load control designed for use on three-phase AC generators equipped with Woodward or other compatible speed controls and compatible automatic voltage regulators. The DSLCTM is a synchronizer, a load sensor, a load control, a dead bus closing system, and optionally a VAR/PF and process control, all integrated into one powerful, yet convenient package.

The DSLCTM control provides either phase matching or slip frequency automatic synchronizing. The DSLCTM talks over its own LON (using Echelon® LonWorks™ network technology) to enable safe dead bus closing, and ties into your automatic voltage regulator to match voltages before paralleling.

The DSLCTM control senses true rms power and provides bumpless loading and unloading functions. It can either base load or set import/export/process power levels against the utility, and through the DSLCTM's LON, accurately share loads on isolated, multi-engine systems.

The optional VAR/PF control is flexible enough to allow you either to provide a set level of VARs to the utility (if this is economical) or to maintain a constant power factor for reliable operation. Through the LON, the VAR/PF control also shares power factors in isolated systems, maintaining proportional reactive loads (kVARs) on all machines more accurately than droop or cross-current voltage systems.

ADVANTAGES

- Reduces wiring between synchronizer, load control and automatic loading controls
- Having functions integrated into one box eliminates the need for redundant sensors (like PTs, CTs and MOPs) that connect to individual modules such as the load sensor and synchronizer
- Hand Held Programmer reduces installation and calibration time by allowing the user to set up the control prior to starting the system

- Synchronizer and Load Control in One Box
- Automatic Generator Loading and Unloading for Bumpless Load Transfer
- Isochronous Load Sharing with Other DSLCTM-Equipped Sets
- Process Import/Export Control
- VAR or Power Factor Control
- Dead Bus Closing
- Accurate Control of Non-Linear and Distorted Generator Wave Forms
- Digital Communications Network for Information Exchange Between Controls
- Programmable Load Switch or Reverse Power Trip Output
- UL and cUL Listed

- Hand Held Programmer lets operator monitor generator parameters, contact switches, and analog I/O for installation and troubleshooting
- Reduces the amount of cabinet space needed
- Eliminates the need for additional relay logic or a PLC to control dead bus closing
- Digital communications across the LAN reduce susceptibility to noise on the load sharing lines
- Slip frequency paralleling, voltage matching, and speed bias hand-off between the synchronizer and load control result in smooth paralleling without the risk of reverse power trips
- Three-phase true rms power sensing makes the DSLC accurate even with unbalanced phase loading and voltage fluctuations
- Can load share with Woodward analog controls when used with the Load Sharing Interface Module. Refer to Woodward Manual # 02031 for details.

OPERATING MODES

Isolated Bus — The DSLC talks over its LON to share proportional real and reactive loads. Real load (kW) is controlled using percentages of full load for each machine, and reactive loads (kVAR) are shared by matching power factors. The DSLC maintains a specified bus voltage and frequency while balancing loads.

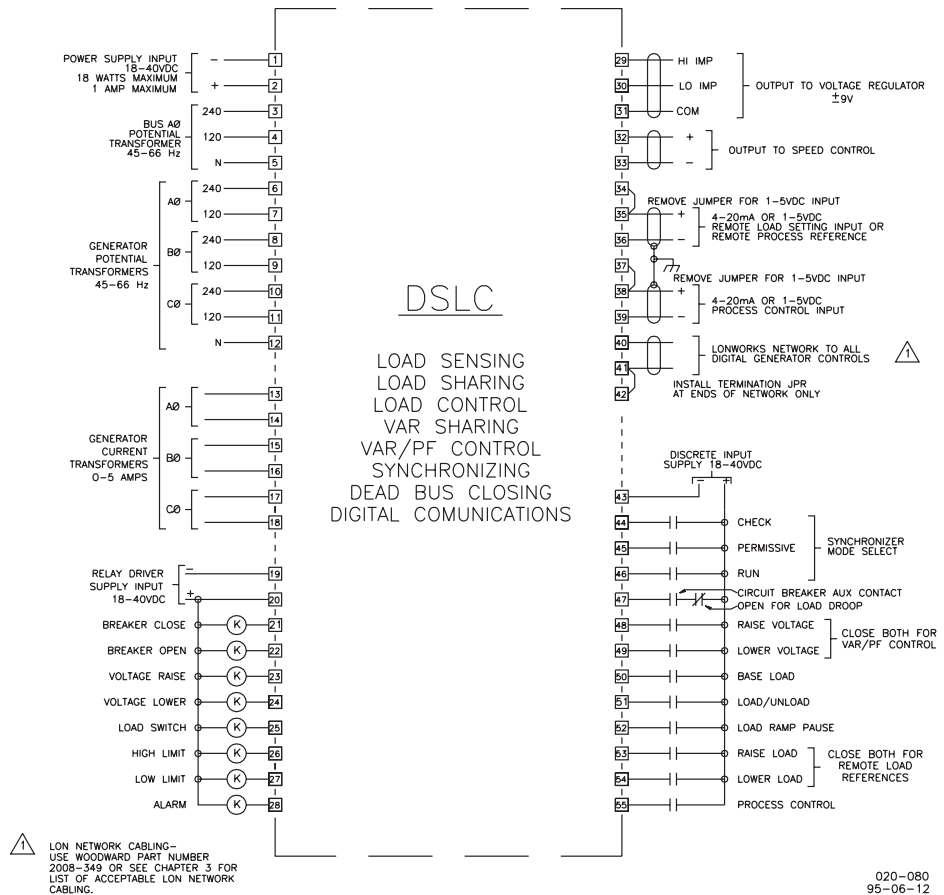
Utility Parallel — The DSLC measures real load (kW) on the generator and adjusts the speed control to match a set base load, to control a process at a user-chosen, externally adjustable setpoint. Or it can set a constant import/export level using an MSLC (Master Synchronizer and Load Control). The DSLC can also measure and maintain a set reactive load (kVAR) or can maintain a user-prescribed power factor.

Transition Between Modes — The DSLC will ramp at a user-chosen rate from one mode to another until the control is within 5% of its target. It then shifts into dynamic control, allowing bumpless operating mode changes. In addition, the DSLC automatically changes its VAR/PF mode when the real load mode is changed to or from an isolated bus, load sharing mode. Manual VAR/PF control may also be selected.

ADJUSTMENTS

The Woodward Hand Held Programmer makes all adjustments quickly and easily, through the control's ten convenient "menus". The control saves all set points in permanent memory, which does not require batteries or other power sources to retain data. The Hand Held Programmer prevents tampering with set points, yet allows entries to be changed at any time.

- Menu 1 – Synchronizer Functions
- Menu 2 – Load Control Functions
- Menu 3 – Process Control Functions
- Menu 4 – VAR/Power Factor Control Functions
- Menu 5 – Configuration
- Menu 6 – Calibration
- Menu 7 – Generator Electric Parameters
- Menu 8 – Control Status Monitor
- Menu 9 – Discrete Inputs/Outputs Monitor
- Menu 0 – Diagnostics



TYPICAL WIRING CONNECTIONS

DSLCL Plant wiring diagram for 120/240 V WYE switchgear configuration.

SPECIFICATIONS

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	-40 to +70 °C (-40 to +158°F)
Storage Temperature	-55 to +105 °C (-67 to +221°F)
Humidity	95% at 38 °C
Electromagnetic Susceptibility	ANSI/IEEE C37.90.2; ANSI C37.90.1-1989
Mechanical Shock	US MIL-STD 810C, Method 516.2, Procedures I, II, V
Vibration	US MIL-STD 167, Type I

ELECTRICAL SPECIFICATIONS

Control Power Supply Input

Operating	8–32 Vdc continuous (as low as 10 Vdc, 1.8 A max, or as high as 77 Vdc for up to 5 min)
Reverse	-56 Vdc continuous
Burden	18 W, 1 A max.

Voltage Sensing Inputs

Voltage:

120 Vac Input (L-N) Wye PT Configuration	65–150 Vac, terminals 4-5, 7–12, 9–12, and 11–12
240 Vac Input (L-N) Wye PT Configuration	150–300 Vac, terminals 3-5, 6–12, 8–12, and 10–12
120 Vac Open Delta PT Configuration	65–150 Vac, terminals 3-5, 6–8, 8–10 and 10–6
240 Vac Open Delta PT Configuration	150–300 Vac, terminals 3-5, 6–8, 8–10, and 10–6
Phases	Three phase generator bus, single phase parallel bus
Frequency	45–66 Hz
Burden	Less than 0.1 VA per phase
Accuracy	0.1% of full scale

Current Inputs

Current	0–5 A rms
Frequency	45 to 66 Hz
Burden	Less than 0.1 VA per phase
Accuracy	0.1% of full scale
Phases	Three phase generator bus
Discrete Inputs	18–40 Vdc @ 10 mA
Relay Driver Outputs	18–40 Vdc @ 200 mA sink
Analog Inputs	4–20 mA @ 243Ω or 1-5 Vdc @ 10kΩ
Local Operating Network	Echelon® LonWorks™ Technology, Standard Protocol, 1.25 MBPS
Calibration and Diagnostics Port	RS422

COMPLIANCE

UL/cUL	Listed
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3800 N. Wilson Ave.
 P.O. Box 3800
 Loveland, CO, U.S.A.
 80539-3800
 Ph: 1 970-663-3900
 Ph: 1 800-835-5182
 Fax: 1 970-962-7050

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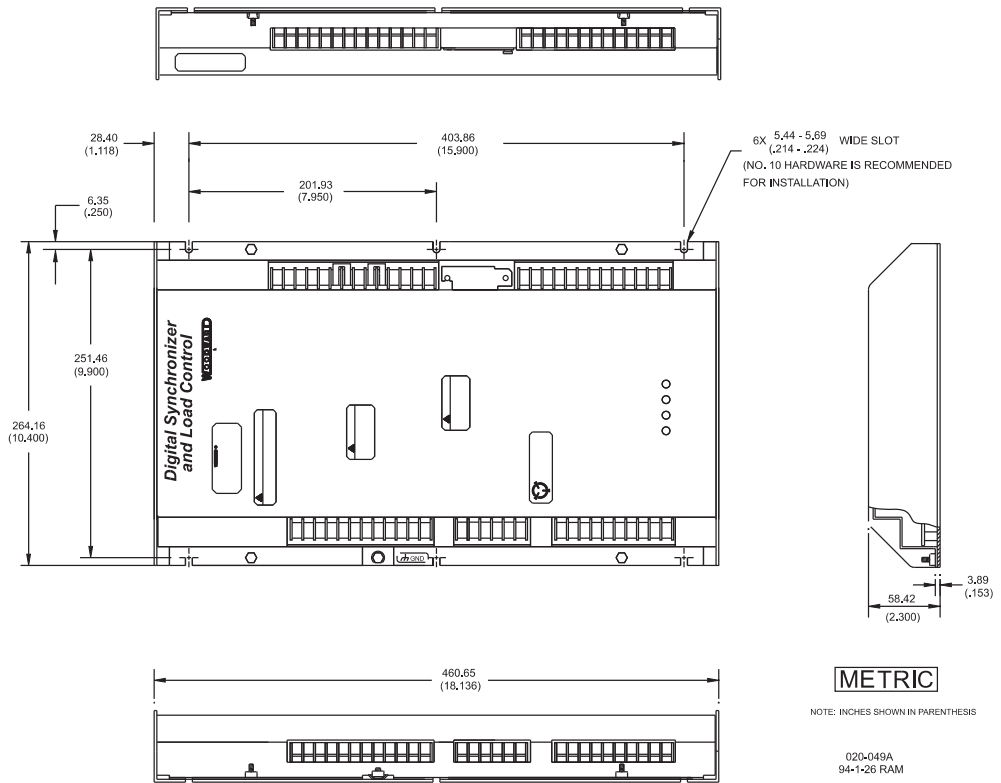
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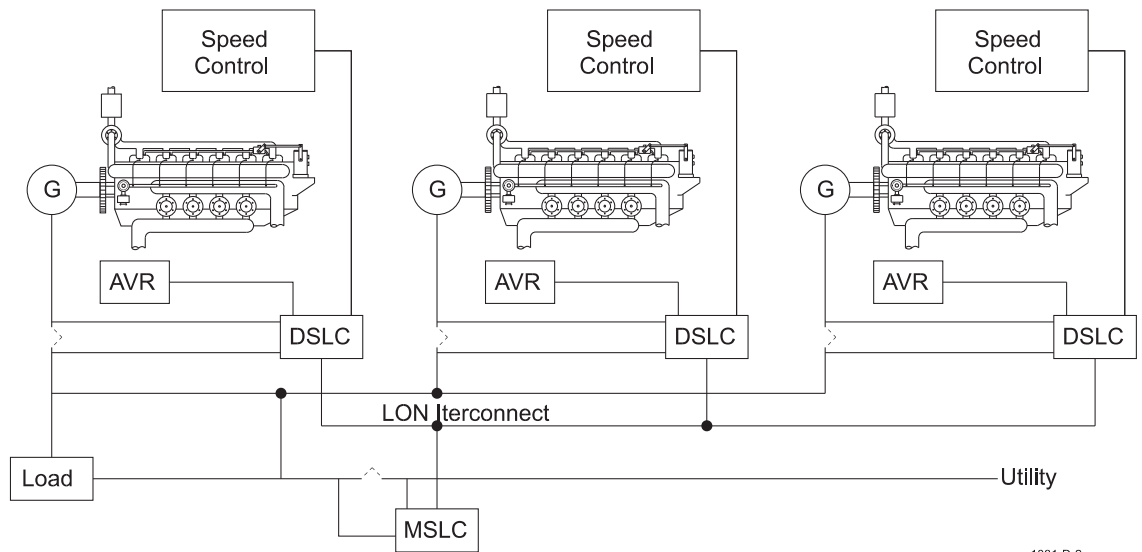
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OUTLINE DRAWING



DSLCL IN A PARALLEL BUS/UTILITY PARALLEL APPLICATION WITH AN MSLC (MASTER SYNCHRONIZER AND LOAD CONTROL)



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For more information contact: