MSLC

Master Synchronizer and Load Control

Applications

The Woodward MSLC is a microprocessor-based load control designed for three-phase electric power generation sites equipped with Woodward DSLC™ Digital Synchronizer and Load Controls which operate in parallel with the utility. The MSLC is a synchronizer, a utility load sensor, an import/export load level control, a power factor control, and a master process control.

The MSLC provides either phase matching or slip frequency automatic synchronizing of the local plant bus to the main power grid. The MSLC talks over its own LON (Local Operating Network using Echelon LonWorks® * network technology) to control real and reactive loading against the utility by DSLC-equipped generators.

The MSLC's load sensor and load control sense true RMS power and provide bumpless loading and unloading against the power grid. They can either base load, set import/export levels, or maintain a plant process control.

The MSLC not only controls the kW loading on the utility tie, but matches plant voltage to the utility prior to paralleling. The control then maintains a chosen power factor or a set VAR import or export level on the associated generators equipped with VAR/PF-controlling DSLC units (or reduced function DSLC units). If the MSLC is used with reduced function DSLC units, the DSLC units will not share VAR/PF on an isolated bus (utility breaker open).

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
- 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
- Digital signal processing makes the MSLC resistant to power line distortions and harmonics
- Digital communications across the LON reduce susceptibility to noise on the load sharing lines
- Three-phase true RMS power sensing makes the MSLC accurate even with unbalanced phase loading and voltage fluctuations
- Local Area Network carries plant parameters for use in a distributed control system

*–LonWorks is a trademark of Echelon Corporation.

- Synchronizer and load control in one box
- Automatic plant loading and unloading for bumpless load transfer to and from the utility
- Controls plant-wide import/export levels against the utility
- Overall plant Power Factor control
- Accurate control of non-linear and distorted utility line wave forms
- Digital communications network for information exchange between MSLC and individual DSLC™ controls
- UL and cUL Listed

Operating Modes

Synchronizing—The MSLC controls all DSLC-equipped generators to match both frequency and voltage between the local bus and the main, and then closes the utility tie breaker when they are synchronized.

Base Load—The MSLC talks over its LON to set all DSLC-equipped generators in isochronous load sharing to a chosen percentage of their individual rated loads and power factor.

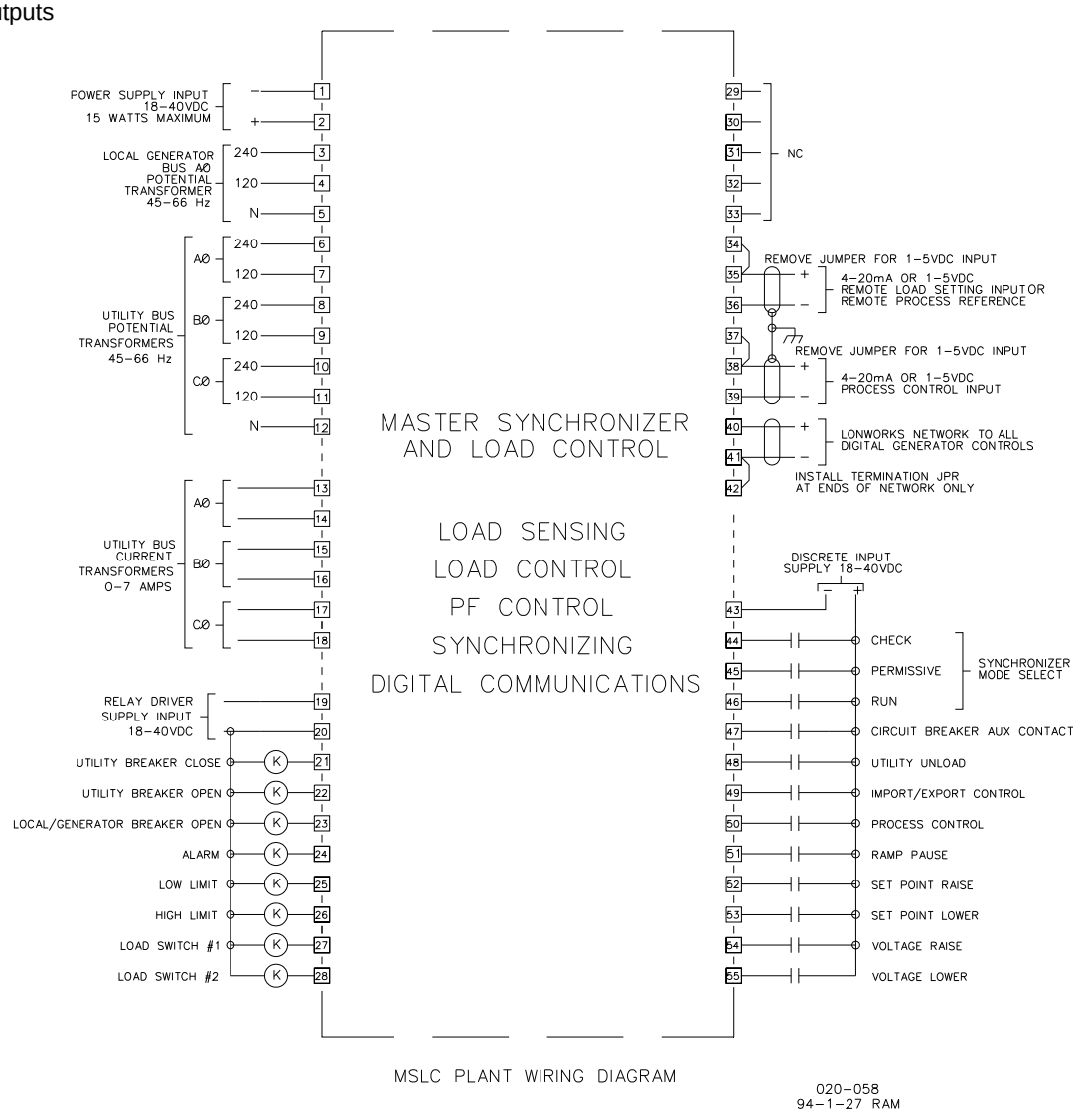
Import/Export Control—The MSLC controls real load and reactive power across the utility tie. Real load (kW) is controlled by changing the load levels; reactive load (kVAR) is controlled by changing the power factor reference on all DSLC-equipped system generators which are in isochronous load sharing.

Process Control—The MSLC control adjusts the real load on the plant generators to maintain a process at a chosen level.

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. The Hand Held Programmer displays in plain English, so there are no codes to look up or memorize.

- Menu 1—Synchronizer
- Menu 2—Load Control
- Menu 3—Load Limits and Switches
- Menu 4—Process Control
- Menu 5—Configuration
- Menu 6—Calibration
- Menu 7—Electric Parameters
- Menu 8—Control Status Monitor
- Menu 9—Discrete Inputs/Outputs
- Menu 0—Diagnostics



Typical Wiring Connections

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 maximum

Voltage Sensing Inputs

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 utility bus, single phase generator bus
Frequency ..... 45–66 Hz
Burden ..... Less than 0.1 VA per phase
Accuracy ..... 0.1% of full scale

Current Transformer Inputs (CTs)

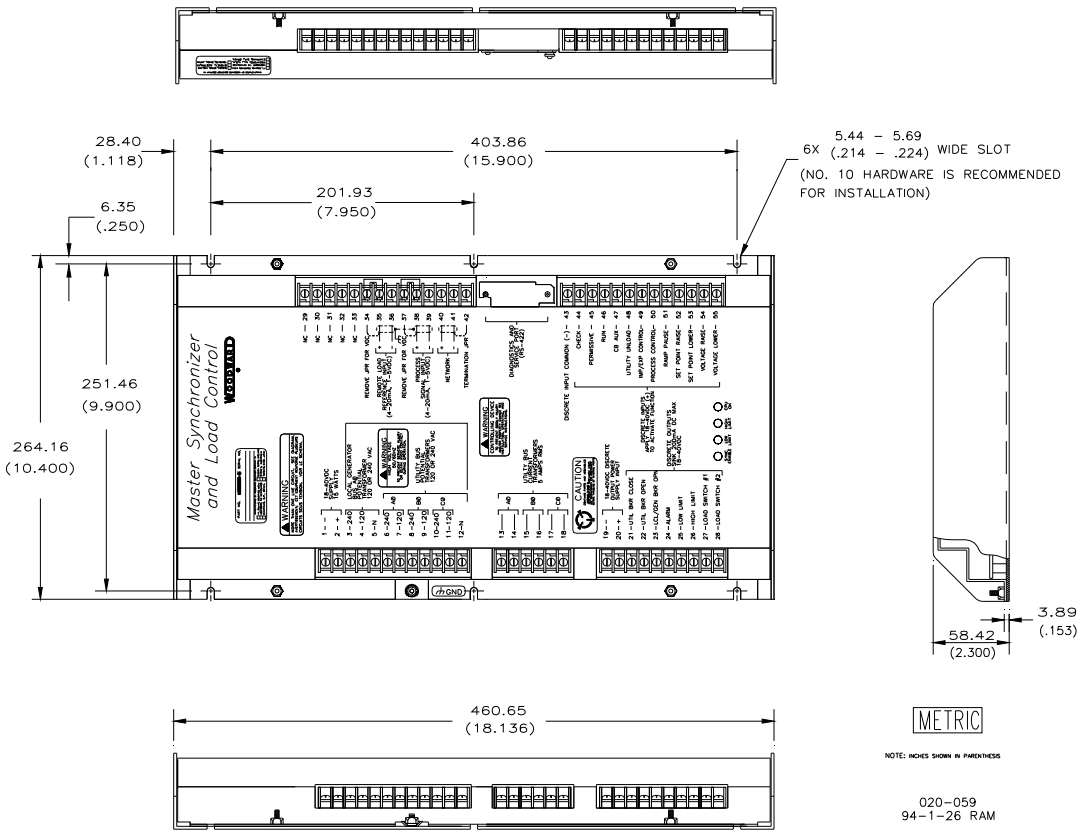
Current ..... 0–5 Arms, 7 Arms max.
Frequency ..... 56 to 66 Hz
Burden ..... Less than 0.1 VA per phase
Accuracy ..... 0.1% of full scale
Phases ..... Three phase utility bus
Discrete Inputs ..... 18–40 Vdc @ 10 mA
Analog Inputs ..... 4–20 mA @ 243 Ω or 1–5 Vdc @ 10 kΩ
Analog Outputs ..... Speed Bias: ±2.5 Vdc, 0.5–4.5 Vdc, 1–5 Vdc across 243 Ω, or 500 Hz PWM
Voltage Bias: high in ±9 Vdc, low in ±3 Vdc, current 50 mA
Relay Driver Outputs ..... 18–40 Vdc @ 200 mA sink
Local Area Network ..... Echelon LonWorks Technology, Standard Protocol, 1.25 MBPS
Calibration and Diagnostics Port RS-422

Compliance

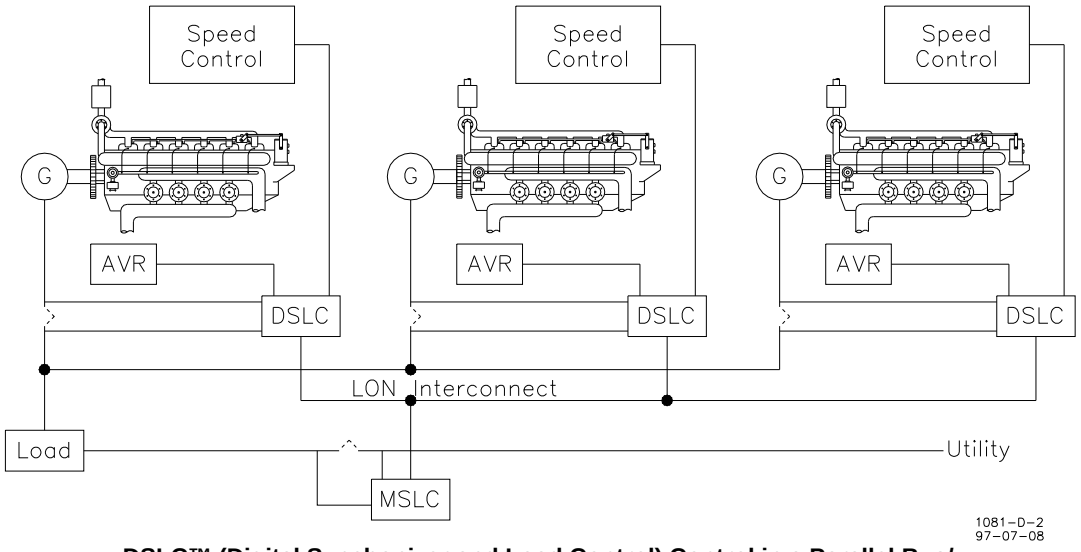
UL/cUL ..... Listed

Technical Manual 02022

MSLC Version	Part Number
Wye, 120 or 240 Vac	9907-004
Open delta, 120 Vac	9907-005
Open delta, 240 Vac	9907-006
MSLC/DSLC Hand Held Programmer	9907-205



MSLC Outline Drawing (Do not use for construction)



DSLC™ (Digital Synchonizer and Load Control) Control in a Parallel Bus/ Utility Parallel Application with an MSLC

WOODWARD

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