

DSL-2 to DSLC-2 Conversion Kit

Instruction Manual



General Precautions

Read this entire manual and all other publications pertaining to the work to be performed before installing, operating, or servicing this equipment.

Practice all plant and safety instructions and precautions.

Failure to follow instructions can cause personal injury and/or property damage.



Revisions

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Proper Use

Any unauthorized modifications to or use of this equipment outside its specified mechanical, electrical, or other operating limits may cause personal injury and/or property damage, including damage to the equipment. Any such unauthorized modifications: (i) constitute "misuse" and/or "negligence" within the meaning of the product warranty thereby excluding warranty coverage for any resulting damage, and (ii) invalidate product certifications or listings.



Translated Publications

If the cover of this publication states "Translation of the Original Instructions" please note:

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Revisions—Changes in this publication since the last revision are indicated by a black line alongside the text.

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Contents

WARNINGS AND NOTICES	2
ELECTROSTATIC DISCHARGE AWARENESS	3
CHAPTER 1. GENERAL INFORMATION	4
Scope of Manual.....	4
DSLCL to DSLCL-2 Conversion Kit Descriptions.....	4
Sheet Metal Chassis.....	5
CHAPTER 2. MOUNTING AND WIRING.....	7
Mounting.....	7
External Wiring	7
Internal Wiring.....	8
CHAPTER 3. INSTALLATION AND SETUP	15
Communications.....	15
Existing Systems Utilizing Segmenting	15
Segmenting.....	16
CHAPTER 4. PRODUCT SUPPORT AND SERVICE OPTIONS	19
Product Support Options	19
Product Service Options.....	19
Returning Equipment for Repair.....	20
Replacement Parts	20
Engineering Services.....	21
Contacting Woodward's Support Organization	21
Technical Assistance.....	22
REVISION HISTORY.....	23

Illustrations and Tables

Figure 1-1. Completed DSLCL to DSLCL-2 Conversion Kit.....	4
Figure 1-2. Sheet Metal Layout with Terminal Blocks.....	5
Figure 1-3. Sheet Metal Dimensions	6
Figure 1-4. Completed Sheet Metal Plate	6
Figure 1-5. Grommet for Wire Thru-Hole	6
Figure 2-1. Mounting Hole Pattern and Dimensions of Original DSLCL	7
Figure 2-2. DSLCL 120 V or 240 V WYE Connected Version	9
Figure 2-3. DSLCL 120 V Open Delta Connected Version	10
Figure 2-4. DSLCL 240 V Open Delta Connected Version	11
Figure 2-5. MSLCL 120 V or 240 V WYE Connected Version	12
Figure 2-6. MSLCL 120 V Open Delta Connected Version.....	13
Figure 2-7. MSLCL 240 V Open Delta Connected Version.....	14
Figure 3-1. One Line Diagram with Network Switches Example.....	15
Figure 3-2. Multiple Generators in Isolated Operation with Tie-Breaker.....	16
Figure 3-3. Multiple Generators in Isolated Operation with Tie-Breaker.....	17
Figure 3-4. Multiple Generators in Parallel Operation with Multiple Utility Ties and Tie-Breakers.....	17
Figure 3-5. Isolated / Utility Parallel Operation with Multiple Generators, Tie-Breakers and Generator Group Breaker	17
Figure 3-6. Isolated Operation with Multiple Generators and Tie Breakers (Ring Option).....	18
Table 1-1. Conversion Kits	5

Warnings and Notices

Important Definitions



This is the safety alert symbol used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

- **DANGER** - Indicates a hazardous situation, which if not avoided, will result in death or serious injury.
- **WARNING** - Indicates a hazardous situation, which if not avoided, could result in death or serious injury.
- **CAUTION** - Indicates a hazardous situation, which if not avoided, could result in minor or moderate injury.
- **NOTICE** - Indicates a hazard that could result in property damage only (including damage to the control).
- **IMPORTANT** - Designates an operating tip or maintenance suggestion.

WARNING

Overspeed / Overtemperature / Overpressure

The engine, turbine, or other type of prime mover should be equipped with an overspeed shutdown device to protect against runaway or damage to the prime mover with possible personal injury, loss of life, or property damage.

The overspeed shutdown device must be totally independent of the prime mover control system. An overtemperature or overpressure shutdown device may also be needed for safety, as appropriate.

WARNING

Personal Protective Equipment

The products described in this publication may present risks that could lead to personal injury, loss of life, or property damage. Always wear the appropriate personal protective equipment (PPE) for the job at hand. Equipment that should be considered includes but is not limited to:

- Eye Protection
- Hearing Protection
- Hard Hat
- Gloves
- Safety Boots
- Respirator

Always read the proper Material Safety Data Sheet (MSDS) for any working fluid(s) and comply with recommended safety equipment.

WARNING

Start-up

Be prepared to make an emergency shutdown when starting the engine, turbine, or other type of prime mover, to protect against runaway or overspeed with possible personal injury, loss of life, or property damage.

WARNING

Automotive Applications

On- and off-highway Mobile Applications: Unless Woodward's control functions as the supervisory control, customer should install a system totally independent of the prime mover control system that monitors for supervisory control of engine (and takes appropriate action if supervisory control is lost) to protect against loss of engine control with possible personal injury, loss of life, or property damage.

NOTICE**Battery Charging
Device**

To prevent damage to a control system that uses an alternator or battery-charging device, make sure the charging device is turned off before disconnecting the battery from the system.

Electrostatic Discharge Awareness

NOTICE**Electrostatic
Precautions**

Electronic controls contain static-sensitive parts. Observe the following precautions to prevent damage to these parts:

- Discharge body static before handling the control (with power to the control turned off, contact a grounded surface and maintain contact while handling the control).
- Avoid all plastic, vinyl, and Styrofoam (except antistatic versions) around printed circuit boards.
- Do not touch the components or conductors on a printed circuit board with your hands or with conductive devices.

To prevent damage to electronic components caused by improper handling, read and observe the precautions in Woodward manual **82715**, *Guide for Handling and Protection of Electronic Controls, Printed Circuit Boards, and Modules*.

Follow these precautions when working with or near the control.

1. Avoid the build-up of static electricity on your body by not wearing clothing made of synthetic materials. Wear cotton or cotton-blend materials as much as possible because these do not store static electric charges as much as synthetics.
2. Do not remove the printed circuit board (PCB) from the control cabinet unless absolutely necessary. If you must remove the PCB from the control cabinet, follow these precautions:
 - Do not touch any part of the PCB except the edges.
 - Do not touch the electrical conductors, the connectors, or the components with conductive devices or with your hands.
 - When replacing a PCB, keep the new PCB in the plastic antistatic protective bag it comes in until you are ready to install it. Immediately after removing the old PCB from the control cabinet, place it in the antistatic protective bag.

IMPORTANT

External wiring connections for reverse-acting controls are identical to those for direct-acting controls.

Chapter 1.

General Information

Scope of Manual

This manual provides the information necessary to replace the Digital Synchronizer and Load Control (DSLCL) with a Digital Synchronizer and Load Control-2 (DSLCL-2) and the Master Synchronizer and Load Control (MSLCL) with the Master Synchronizer and Load Control-2 (MSLCL-2). Topics covered include mechanical installation and internal and external electrical wiring. The following manuals will help in the set-up and commissioning of the DSLCL-2 / MSLCL-2 system.

DSLCL Manual – 02007

MSLCL Manual – 02021

DSLCL-2 Manual – 37443

MSLCL-2 Manual – 37444

Woodward Drawing – 8923-2359

DSLCL to DSLCL-2 Conversion Kit Descriptions

Woodward's DSLCL to DSLCL-2 Conversion Kit includes the following components:

- Sheet metal chassis with terminal blocks
- DSLCL-2 pre-wired to the mounted terminal blocks

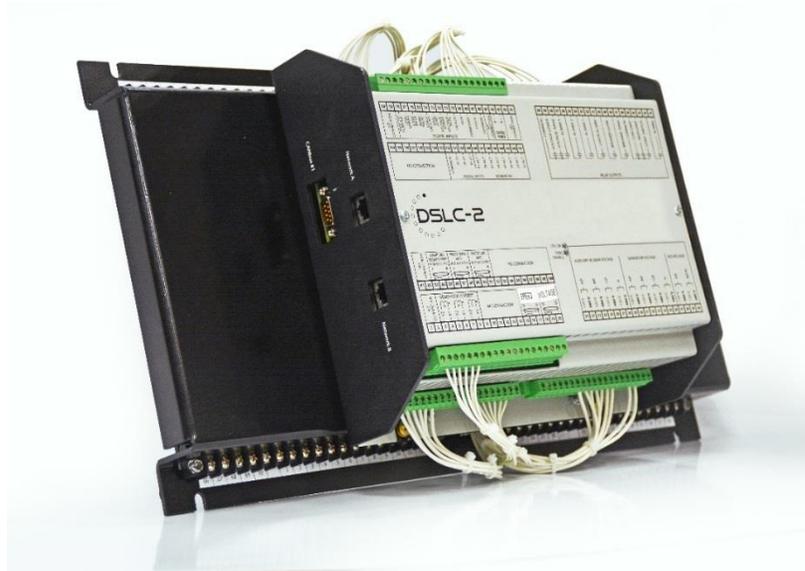


Figure 1-1. Completed DSLCL to DSLCL-2 Conversion Kit

There are six Conversion Kits to choose from, as shown in Table 1-1. Wiring diagrams for each can be found in Chapter 2.

Table 1-1. Conversion Kits

DSLCL Part Number	PT Configuration	Voltage Input	Conversion Kit Designation
DSLCL CONVERSION KITS			
9905-355	Wye	120 or 240	DSLCL 120 V or 240 V Wye Connected Version
9905-603			
9905-795			
9905-799			
9905-367	Open Delta	120	DSLCL 120 V Open Delta Connected Version
9905-373			
9905-708			
9905-797			
9905-363	Open Delta	240	DSLCL 240 V Open Delta Connected Version
MSLCL CONVERSION KITS			
MSLCL Part Number	PT Configuration	Voltage Input	Conversion Kit Part Number
9907-004	Wye	120 or 240	MSLCL 120 V or 240 V Wye Connected Version
9907-005	Open Delta	120	MSLCL 120 V Open Delta Connected Version
9907-006	Open Delta	240	MSLCL 240 V Open Delta Connected Version

Sheet Metal Chassis

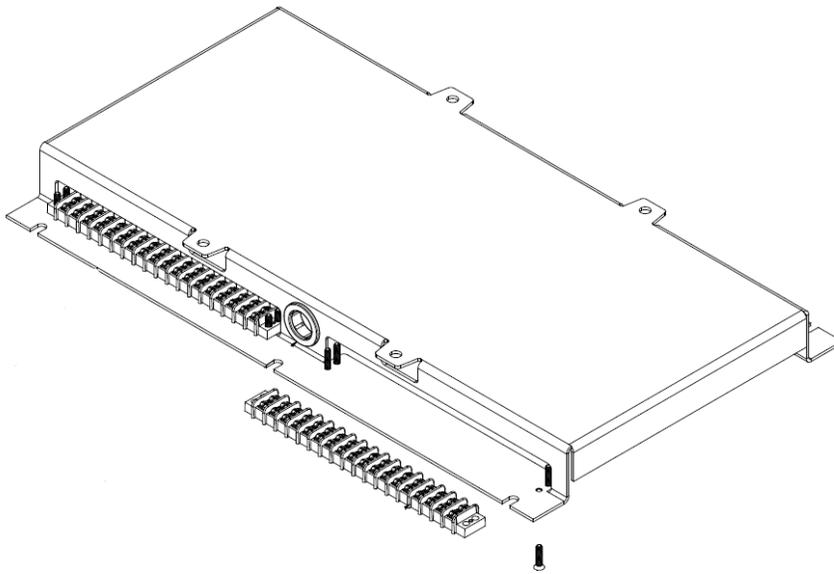
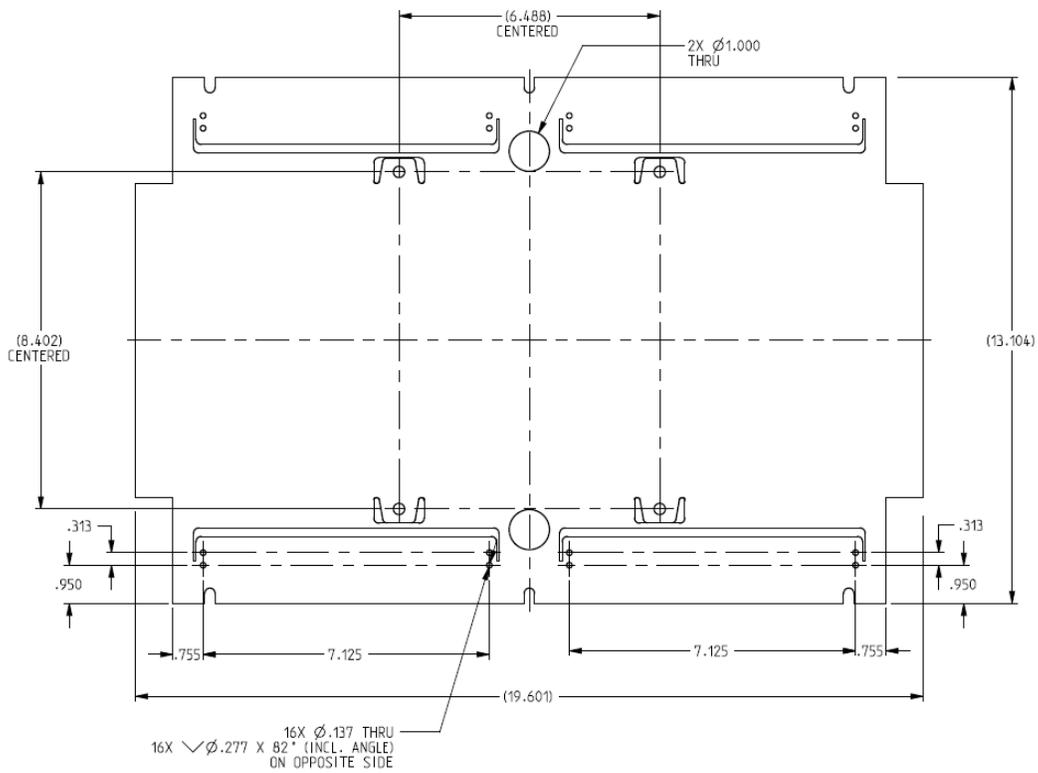


Figure 1-2. Sheet Metal Layout with Terminal Blocks



8923-2359
APPROXIMATE FLAT PATTERN ONLY
(DIMENSIONS TYPICAL FOR BOTH SIDES)

Figure 1-3. Sheet Metal Dimensions



Figure 1-4. Completed Sheet Metal Plate

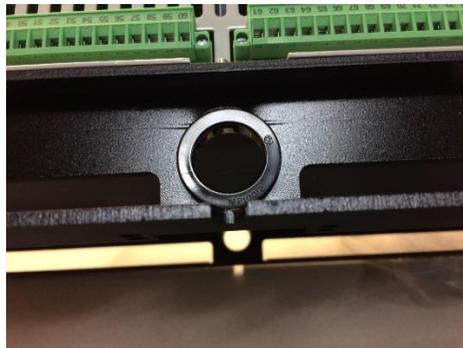


Figure 1-5. Grommet for Wire Thru-Hole

Chapter 2. Mounting and Wiring

This chapter provides general information on replacing the DSLCL with the DSLCL-2 Conversion Kit and the associated wiring.

Mounting

Location Considerations

The DSLCL-2 Conversion Kit will mount approximately 4.875 inches tall. The original DSLCL was 2.3 inches. Please verify that the conversion kit will mount properly with no obstructions.

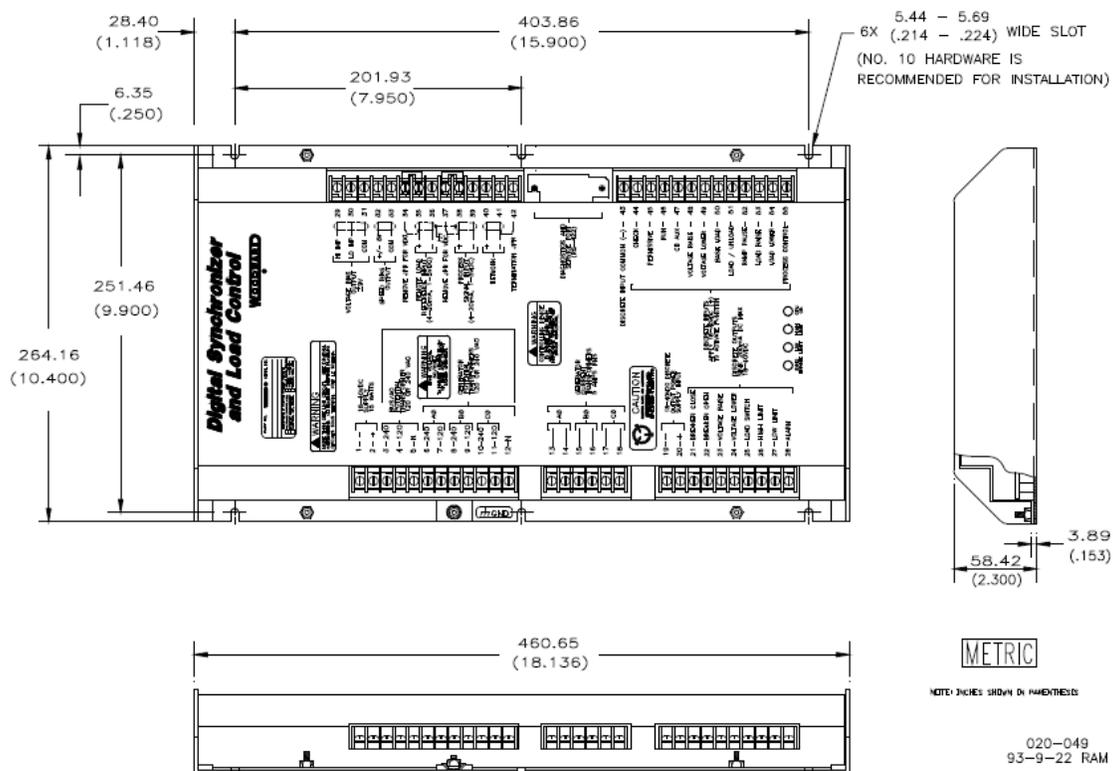


Figure 2-1. Mounting Hole Pattern and Dimensions of Original DSLCL

External Wiring

The new DSLCL-2 kit will mount directly in the same mounting holes as the original DSLCL. The wire locations are closely matched and should be close when completing the external wiring.

Steps for installing the DSLCL-2 conversion kit.

1. Verify that you have the original DSLCL settings written down. This will help in the set-up of the DSLCL-2.
2. Verify that the existing wires are labeled, so that when installing the DSLCL-2, wiring errors are eliminated.
3. Verify that no AC or DC power is applied to the DSLCL!

4. Remove the wire connections from the DSLCL. The Echelon LON Wires on terminals 40 and 41 will not be used any more. Communications is done over Ethernet communications on Ethernet Network A.
5. Remove the six mounting screws holding the DSLCL in place.
6. Install the DSLCL-2 kit in its place.
7. Re-install the six mounting screws to hold the DSLCL-2 in place.
8. Connect the original wires to the DSLCL-2 terminal blocks.
9. If this is a multi-engine system, connect the Ethernet cables to the Ethernet switch.
10. If this is a multi-engine system with bus segments and intermediate breakers, wiring must be completed from these breakers to assure correct communications. See section on Bus Segmenting.

IMPORTANT

The DSLCL -2 will require a new Ethernet connection from DSLCL-1 to DSLCL-2, since the Echelon LON™ wires are not used.

Internal Wiring

Figures 2-2 thru 2-7 show all six of the different wiring configurations. Wiring shown is from the DSLCL terminal blocks to the DSLCL-2 terminal blocks.

DSLCL, 120V or 240 V, WYE Connected Version

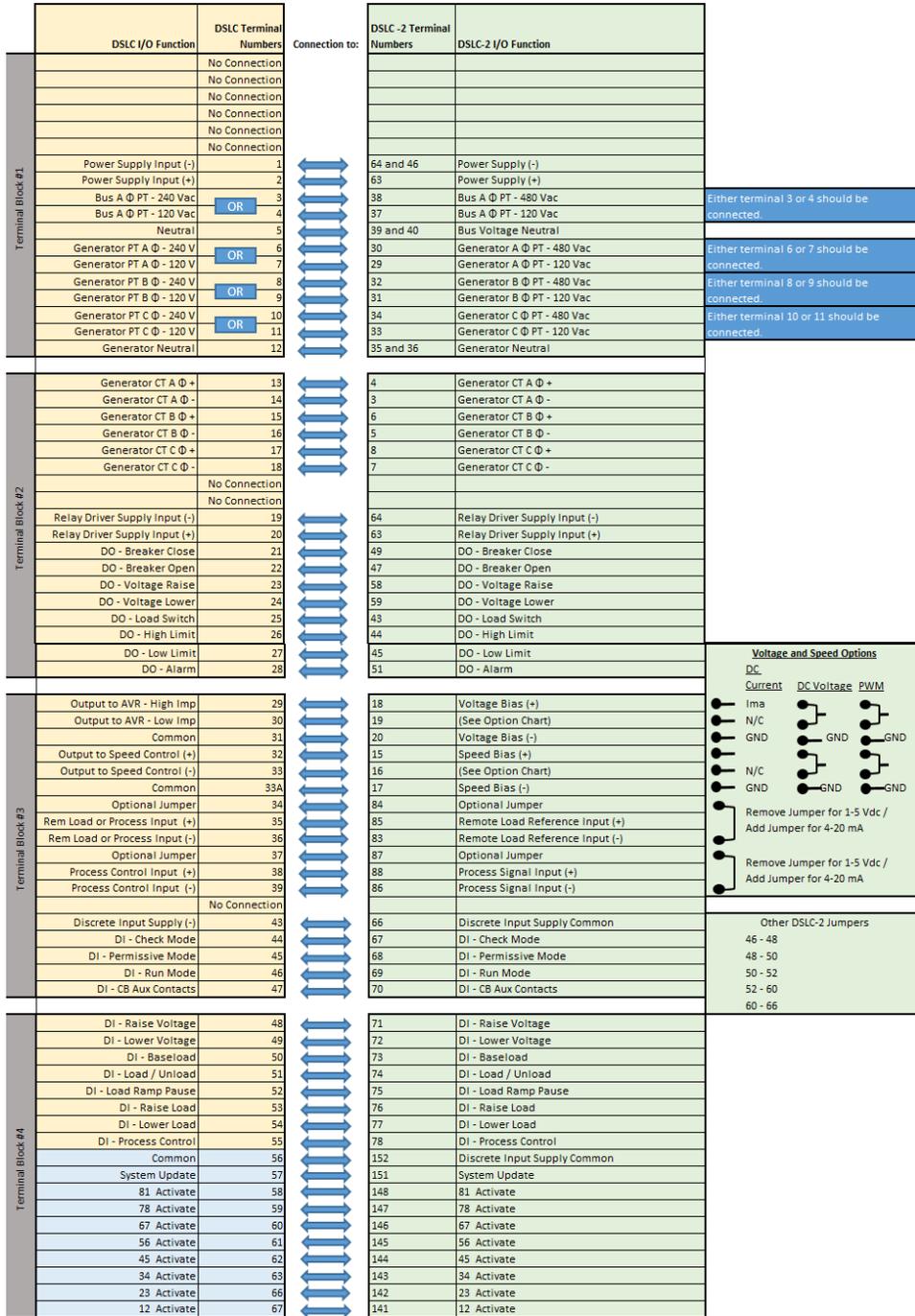


Figure 2-2. DSLCL 120 V or 240 V WYE Connected Version

DSLCL, 120 V, Open Delta Connected Version

	DSLCL I/O Function	DSLCL Terminal Numbers	Connection to:	DSLCL-2 Terminal Numbers	DSLCL-2 I/O Function
Terminal Block #1	No Connection				
	No Connection				
	No Connection				
	No Connection				
	No Connection				
	No Connection				
	Power Supply Input (-)	1	↔	64 and 46	Power Supply (-)
	Power Supply Input (+)	2	↔	63	Power Supply (+)
	Bus A Φ PT - 120 Vac	3	↔	37	Bus A Φ PT - 120 Vac
	No Connection	4			
	Bus B Φ PT - 120 Vac	5	↔	39 and 40	Bus Voltage Neutral
	Generator PT A Φ - 120 V	6	↔	29	Generator A Φ PT - 120 Vac
No Connection	7				
Generator PT B Φ - 120 V	8	↔	31	Generator B Φ PT - 120 Vac	
No Connection	9				
Generator PT C Φ - 120 V	10	↔	33	Generator C Φ PT - 120 Vac	
No Connection	11				
No Connection	12				
Terminal Block #2	Generator CT A Φ +	13	↔	4	Generator CT A Φ +
	Generator CT A Φ -	14	↔	3	Generator CT A Φ -
	Generator CT B Φ +	15	↔	6	Generator CT B Φ +
	Generator CT B Φ -	16	↔	5	Generator CT B Φ -
	Generator CT C Φ +	17	↔	8	Generator CT C Φ +
	Generator CT C Φ -	18	↔	7	Generator CT C Φ -
	No Connection				
	No Connection				
	Relay Driver Supply Input (-)	19	↔	64	Relay Driver Supply Input (-)
	Relay Driver Supply Input (+)	20	↔	63	Relay Driver Supply Input (+)
	DO - Breaker Close	21	↔	49	DO - Breaker Close
	DO - Breaker Open	22	↔	47	DO - Breaker Open
	DO - Voltage Raise	23	↔	58	DO - Voltage Raise
	DO - Voltage Lower	24	↔	59	DO - Voltage Lower
	DO - Load Switch	25	↔	43	DO - Load Switch
	DO - High Limit	26	↔	44	DO - High Limit
	DO - Low Limit	27	↔	45	DO - Low Limit
	DO - Alarm	28	↔	51	DO - Alarm
Terminal Block #3	Output to AVR - High Imp	29	↔	18	Voltage Bias (+)
	Output to AVR - Low Imp	30	↔	19	(See Option Chart)
	Common	31	↔	20	Voltage Bias (-)
	Output to Speed Control (+)	32	↔	15	Speed Bias (+)
	Output to Speed Control (-)	33	↔	16	(See Option Chart)
	Common	33A	↔	17	Speed Bias (-)
	Optional Jumper	34	↔	84	Optional Jumper
	Rem Load or Process Input (+)	35	↔	85	Remote Load Reference Input (+)
	Rem Load or Process Input (-)	36	↔	83	Remote Load Reference Input (-)
	Optional Jumper	37	↔	87	Optional Jumper
	Process Control Input (+)	38	↔	88	Process Signal Input (+)
	Process Control Input (-)	39	↔	86	Process Signal Input (-)
	No Connection				
	Discrete Input Supply (-)	43	↔	66	Discrete Input Supply Common
	DI - Check Mode	44	↔	67	DI - Check Mode
DI - Permissive Mode	45	↔	68	DI - Permissive Mode	
DI - Run Mode	46	↔	69	DI - Run Mode	
DI - CB Aux Contacts	47	↔	70	DI - CB Aux Contacts	
Terminal Block #4	DI - Raise Voltage	48	↔	71	DI - Raise Voltage
	DI - Lower Voltage	49	↔	72	DI - Lower Voltage
	DI - Baseload	50	↔	73	DI - Baseload
	DI - Load / Unload	51	↔	74	DI - Load / Unload
	DI - Load Ramp Pause	52	↔	75	DI - Load Ramp Pause
	DI - Raise Load	53	↔	76	DI - Raise Load
	DI - Lower Load	54	↔	77	DI - Lower Load
	DI - Process Control	55	↔	78	DI - Process Control
	Common	56	↔	152	Discrete Input Supply Common
	System Update	57	↔	151	System Update
	81 Activate	58	↔	148	81 Activate
	78 Activate	59	↔	147	78 Activate
	67 Activate	60	↔	146	67 Activate
	56 Activate	61	↔	145	56 Activate
	45 Activate	62	↔	144	45 Activate
34 Activate	63	↔	143	34 Activate	
23 Activate	66	↔	142	23 Activate	
12 Activate	67	↔	141	12 Activate	

Voltage and Speed Options

DC Current	DC Voltage	PWM
ima		
N/C		
GND	GND	GND
N/C		
GND	GND	GND

Remove Jumper for 1-5 Vdc / Add Jumper for 4-20 mA

Remove Jumper for 1-5 Vdc / Add Jumper for 4-20 mA

Other DSLCL-2 Jumpers

46 - 48
48 - 50
50 - 52
52 - 60
60 - 66

Figure 2-3. DSLCL 120 V Open Delta Connected Version

DSLCL, 240 Vac, Open Delta Connected Version

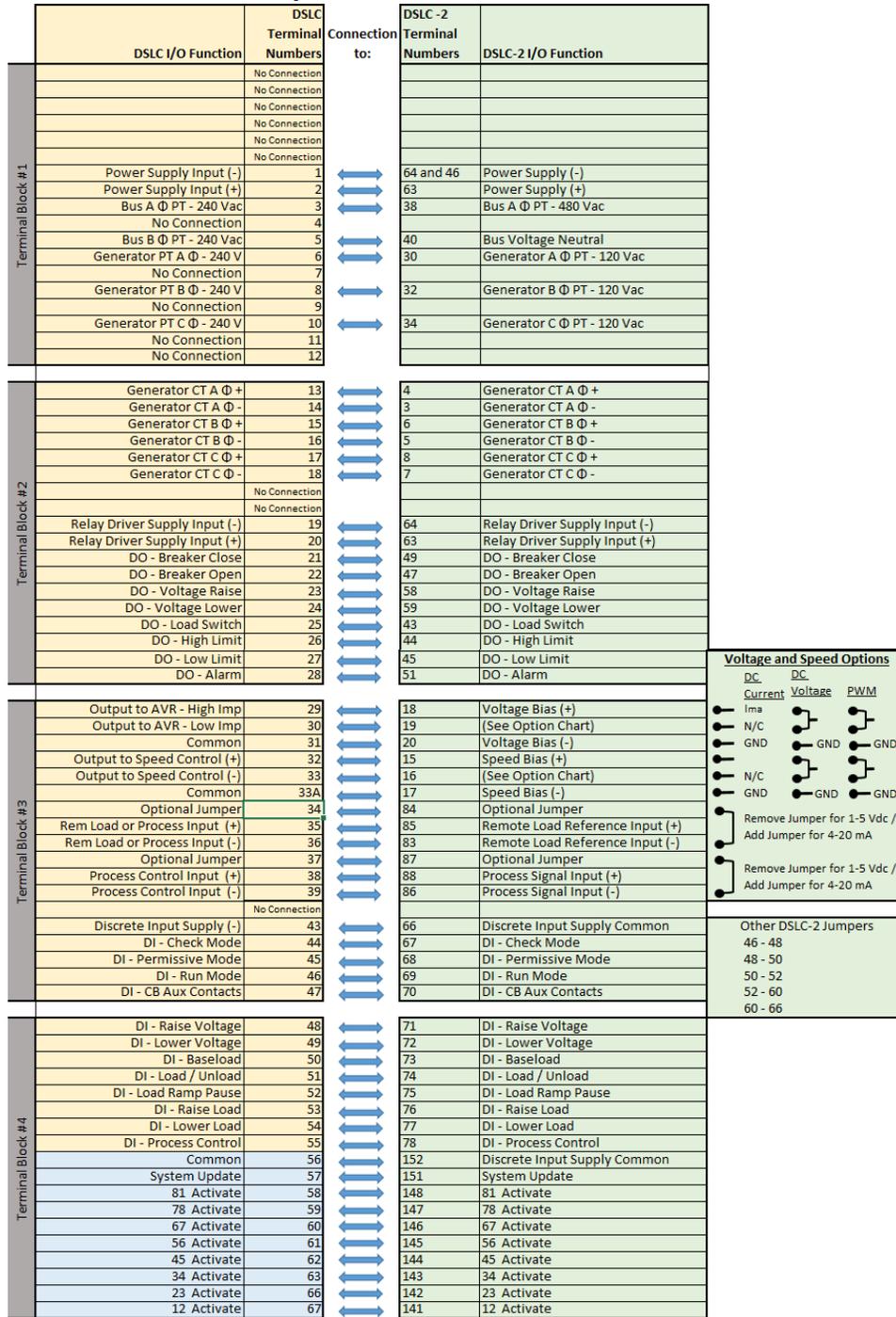


Figure 2-4. DSLCL 240 V Open Delta Connected Version

MSLCL, 120/240 Vac, WYE Connected Version

	DSLCL I/O Function	MSLCL Terminal	Connection to:	MSLCL - 2 Termin	DSLCL-2 I/O Function		
Terminal Block #1		No Connection					
		No Connection					
		No Connection					
		No Connection					
		No Connection					
		No Connection					
		No Connection					
		Power Supply Input (-)	1	↔	64 and 48	Power Supply (-)	
		Power Supply Input (+)	2	↔	63	Power Supply (+)	
		Local Generator A ϕ PT - 240 Vac	3	↔	38	System B Voltage A ϕ PT - 480 Va	Either terminal 3 or 4 should be connected.
		Local Generator A ϕ PT - 120 Vac	4	↔	37	System B Voltage A ϕ PT - 120 Vac	
		Neutral	5	↔	39 and 40	System Voltage Neutral	
	Utility Bus PT A ϕ - 240 V	6	↔	30	System A Voltage A ϕ PT - 480 Va	Either terminal 6 or 7 should be connected.	
	Utility Bus PT A ϕ - 120 V	7	↔	29	System A Voltage A ϕ PT - 120 Vac		
	Utility Bus PT B ϕ - 240 V	8	↔	32	System A Voltage B ϕ PT - 480 Va	Either terminal 8 or 9 should be connected.	
	Utility Bus PT B ϕ - 120 V	9	↔	31	System A Voltage B ϕ PT - 120 Vac		
	Utility Bus PT C ϕ - 240 V	10	↔	34	System A Voltage C ϕ PT - 480 Va	Either terminal 10 or 11 should be connected.	
	Utility Bus PT C ϕ - 120 V	11	↔	33	System A Voltage C ϕ PT - 120 Vac		
	Neutral	12	↔	35 and 36	System A Voltage Neutral		
Terminal Block #2		No Connection					
		No Connection					
		Utility Bus CT A ϕ +	13	↔	4	Generator CT A ϕ +	
		Utility Bus CT A ϕ -	14	↔	3	Generator CT A ϕ -	
		Utility Bus CT B ϕ +	15	↔	6	Generator CT B ϕ +	
		Utility Bus CT B ϕ -	16	↔	5	Generator CT B ϕ -	
		Utility Bus CT C ϕ +	17	↔	8	Generator CT C ϕ +	
		Utility Bus CT C ϕ -	18	↔	7	Generator CT C ϕ -	
		No Connection					
		No Connection					
	Relay Driver Supply Input (-)	19	↔	64	Relay Driver Supply Input (-)		
	Relay Driver Supply Input (+)	20	↔	63	Relay Driver Supply Input (+)		
	DO - Utility Breaker Close	21	↔	49	DO - Breaker Close		
	DO - Utility Breaker Open	22	↔	47	DO - Breaker Open		
	DO - Local / Gen Breaker Open	23	↔	51	DO - Local / Gen Breaker Open		
	DO - Alarm	24	↔	41	DO - Alarm		
	DO - Low Limit	25	↔	45	DO - Low Limit		
	DO - High Limit	26	↔	44	DO - High Limit		
	DO - Load Switch #1	27	↔	58	DO - Load Switch #1		
	DO - Load Switch #2	28	↔	59	DO - Load Switch #2		
Terminal Block #3		No Connection					
		No Connection					
		No Connection					
		No Connection					
		No Connection					
		No Connection					
		No Connection					
		Optional Jumper	34	↔	84	Optional Jumper	Remove Jumper for 1-5 Vdc / Add Jumper for 4-20 mA
		Rem Load or Process Input (+)	35	↔	85	Remote Load Reference Input (+)	
		Rem Load or Process Input (-)	36	↔	83	Remote Load Reference Input (-)	
	Optional Jumper	37	↔	87	Optional Jumper	Remove Jumper for 1-5 Vdc / Add Jumper for 4-20 mA	
	Process Control Input (+)	38	↔	88	Process Signal Input (+)		
	Process Control Input (-)	39	↔	86	Process Signal Input (-)		
	No Connection						
	Discrete Input Supply (-)	43	↔	66	Discrete Input Supply Common	Other MSLCL-2 Jumpers 46 - 48 48 - 50 50 - 52 52 - 60 60 - 66 66 - 152	
	DI - Check Mode	44	↔	67	DI - Check Mode		
	DI - Permissive Mode	45	↔	68	DI - Permissive Mode		
	DI - Run Mode	46	↔	69	DI - Run Mode		
	DI - CB Aux Contacts	47	↔	70	DI - CB Aux Contacts		
Terminal Block #4		DI - Utility Unload	48	↔	74	DI - Utility Unload	
		DI - Import / Export Control	49	↔	149	DI - Import / Export Control	
		DI - Process Control	50	↔	78	DI - Process Control	
		DI - Ramp Pause	51	↔	74	DI - Load Ramp Pause	
		DI - Set Point Raise	52	↔	76	DI - Set Point Raise	
		DI - Set Point Lower	53	↔	77	DI - Set Point Lower	
		DI - Voltage Raise	54	↔	71	DI - Raise Voltage	
		DI - Voltage Lower	55	↔	72	DI - Lower Voltage	
		Common	56	↔	152	Discrete Input Supply Common	
		System Update	57	↔	151	System Update	
		81 Activate	58	↔	148	8-1 Activate	
		78 Activate	59	↔	147	7-8 Activate	
		67 Activate	60	↔	146	6-7 Activate	
		56 Activate	61	↔	145	5-6 Activate	
		45 Activate	62	↔	144	4-5 Activate	
	34 Activate	63	↔	143	3-4 Activate		
	23 Activate	66	↔	142	2-3 Activate		
	12 Activate	67	↔	141	1-2 Activate		

Figure 2-5. MSLCL 120 V or 240 V WYE Connected Version

MSLCL, 120 Vac, Open Delta Connected Version

	MSLCL I/O Function	MSLCL Terminal Numbers	Connection to:	MSLCL-2 Terminal Numbers	MSLCL-2 I/O Function
Terminal Block #1	No Connection				
	No Connection				
	No Connection				
	No Connection				
	No Connection				
	No Connection				
	Power Supply Input (-)	1	↔	64 and 46	Power Supply (-)
	Power Supply Input (+)	2	↔	63	Power Supply (+)
	Local Generator A Φ PT - 120 Vac	3	↔	37	System B Voltage A Φ PT - 120 Vac
	No Connection	4			
	Local Generator B Φ PT - 120 Vac	5	↔	39	System B Voltage B Φ PT - 120 Vac
	Utility Bus PT A Φ - 120 V	6	↔	29	System A Voltage A Φ PT - 120 Vac
No Connection	7				
Utility Bus PT B Φ - 120 V	8	↔	31	System A Voltage B Φ PT - 120 Vac	
No Connection	9				
Utility Bus PT C Φ - 120 V	10	↔	33	System A Voltage C Φ PT - 120 Vac	
No Connection	11				
No Connection	12				
Terminal Block #2	Utility Bus CT A Φ +	13	↔	4	Generator CT A Φ +
	Utility Bus CT A Φ -	14	↔	3	Generator CT A Φ -
	Utility Bus CT B Φ +	15	↔	6	Generator CT B Φ +
	Utility Bus CT B Φ -	16	↔	5	Generator CT B Φ -
	Utility Bus CT C Φ +	17	↔	8	Generator CT C Φ +
	Utility Bus CT C Φ -	18	↔	7	Generator CT C Φ -
	No Connection				
	No Connection				
	Relay Driver Supply Input (-)	19	↔	64	Relay Driver Supply Input (-)
	Relay Driver Supply Input (+)	20	↔	63	Relay Driver Supply Input (+)
	DO - Utility Breaker Close	21	↔	49	DO - Breaker Close
	DO - Utility Breaker Open	22	↔	47	DO - Breaker Open
	DO - Local / Gen Breaker Open	23	↔	51	DO - Local / Gen Breaker Open
	DO - Alarm	24	↔	41	DO - Alarm
	DO - Low Limit	25	↔	45	DO - Low Limit
	DO - High Limit	26	↔	44	DO - High Limit
DO - Load Switch #1	27	↔	58	DO - Load Switch #1	
DO - Load Switch #2	28	↔	59	DO - Load Switch #2	
Terminal Block #3	No Connection	28	↔		
	No Connection	29	↔		
	No Connection	30	↔		
	No Connection	31	↔		
	No Connection	32	↔		
	No Connection	33	↔		
	Optional Jumper	34	↔	84	Optional Jumper
	Rem Load or Process Input (+)	35	↔	85	Remote Load Reference Input (+)
	Rem Load or Process Input (-)	36	↔	83	Remote Load Reference Input (-)
	Optional Jumper	37	↔	87	Optional Jumper
	Process Control Input (+)	38	↔	88	Process Signal Input (+)
	Process Control Input (-)	39	↔	86	Process Signal Input (-)
	No Connection				
	Discrete Input Supply (-)	43	↔	66	Discrete Input Supply Common
DI - Check Mode	44	↔	67	DI - Check Mode	
DI - Permissive Mode	45	↔	68	DI - Permissive Mode	
DI - Run Mode	46	↔	69	DI - Run Mode	
DI - CB Aux Contacts	47	↔	70	DI - CB Aux Contacts	
Terminal Block #4	DI - Utility Unload	48	↔	74	DI - Utility Unload
	DI - Import / Export Control	49	↔	149	DI - Import / Export Control
	DI - Process Control	50	↔	78	DI - Process Control
	DI - Ramp Pause	51	↔	74	DI - Load Ramp Pause
	DI - Set Point Raise	52	↔	76	DI - Set Point Raise
	DI - Set Point Lower	53	↔	77	DI - Set Point Lower
	DI - Voltage Raise	54	↔	71	DI - Raise Voltage
	DI - Voltage Lower	55	↔	72	DI - Lower Voltage
	Common	56	↔	152	Discrete Input Supply Common
	System Update	57	↔	151	System Update
	81 Activate	58	↔	148	8-1 Activate
	78 Activate	59	↔	147	7-8 Activate
	67 Activate	60	↔	146	6-7 Activate
	56 Activate	61	↔	145	5-6 Activate
	45 Activate	62	↔	144	4-5 Activate
	34 Activate	63	↔	143	3-4 Activate
	23 Activate	66	↔	142	2-3 Activate
12 Activate	67	↔	141	1-2 Activate	

Remove Jumper for 1-5 Vdc / Add Jumper for 4-20 mA

Remove Jumper for 1-5 Vdc / Add Jumper for 4-20 mA

Other MSLCL-2 Jumpers

- 46 - 48
- 48 - 50
- 50 - 52
- 52 - 60
- 60 - 66
- 66 - 152

Figure 2-6. MSLCL 120 V Open Delta Connected Version

Chapter 3. Installation and Setup

This chapter provides extra information on replacing the DSLCL / MSLCL with the DSLCL-2 / MSLCL-2 Conversion Kit and the associated wiring.

Communications

The original DSLCL / MSLCL system utilized the Echelon LON™ technology which consisted of a two-wire communication protocol. The DSLCL-2 / MSLCL-2 utilizes Ethernet technology for load sharing and all of the communications between devices. Therefore, for ease of installation, it is recommended to create this Ethernet network first.

The network addressing of the DSLCL-2 / MSLCL-2 allows up to 32 DSLCL-2s and 16 MSLCL-2s in an application.

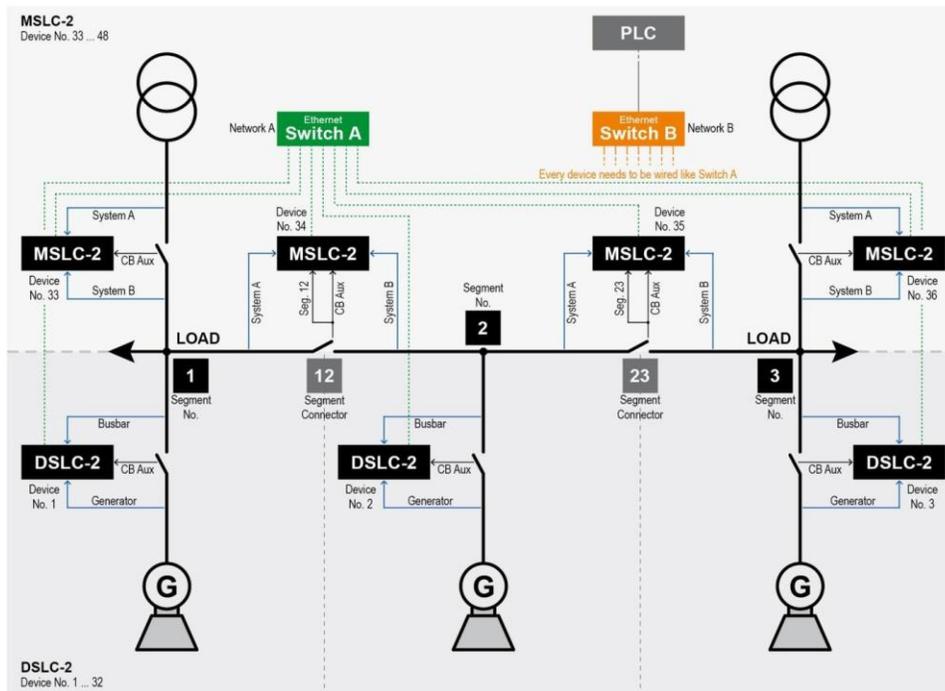


Figure 3-1. One Line Diagram with Network Switches Example

Existing Systems Utilizing Segmenting

The existing DSLCL systems utilized the LON Termination Switch Modules for bus segmenting. Since the new DSLCL-2 / MSLCL-2 systems use Ethernet communications, this Echelon Network will have to be replaced with an Ethernet switch.

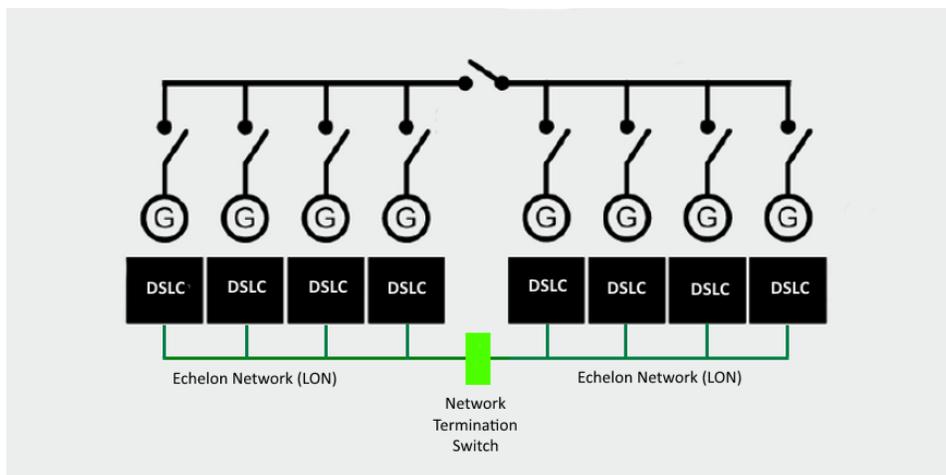


Figure 3-2. Multiple Generators in Isolated Operation with Tie-Breaker

Segmenting

A DSLC-2 and MSLC-2 application can handle 8 segments. Discrete inputs inform the DSLC-2s and MSLC-2s which segments each generator and utilities are operating. If a MSLC-2 receives a discrete input to activate segment 1 and 2, it will share this information with all controls over the Ethernet bus. It is not necessary to provide a segment activation discrete input to all controls. Segmenting allows the DSLC-2s and MSLC-2s to remain connected thru the Ethernet bus, but be operating on separate load buses.

The DSLC-2 / MSLC-2 system can be applied according to following rules:

- The maximum number of DSLC-2s (Gen-CB) is 32.
- The maximum number of MSLC-2s (Utility- or Tie-CB) is 16.
- The maximum number of segments is 8.
- The segment numbers have to follow a line, which can finally be closed to a ring.
- Only one MSLC-2 can be used as master control when multiple MSLC-2s reside on one segment.
- The MSLC-2 with the lower device number will control if multiple utility MSLC-2s are active on the same segment.
- The generator is not counted as a segment.
- The utility is not counted as a segment.
- It can be selected between two segmenting modes:
 - **Bus segmenting** determining generators running together via an algorithm.
 - **Device segmenting** determining generators running together from outside.

IMPORTANT

If different MSLC-2s, located in different segments, are connected via a tie-MSLC-2, more than one MSLC-2 is now located in the same segment. The result is that the MSLC-2 with the lowest device number becomes the master of all MSLC-2s located in this segment.

Examples of Bus Segmenting

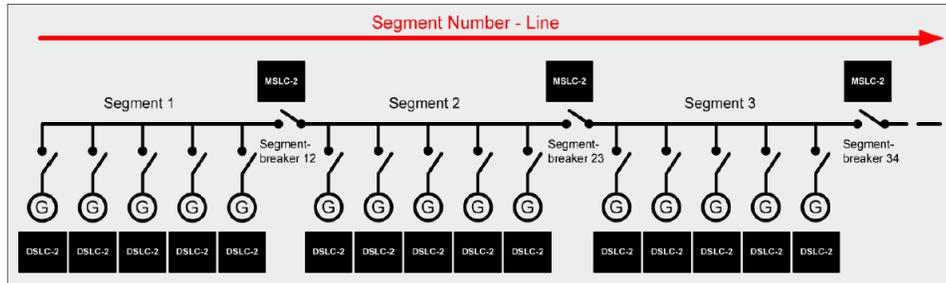


Figure 3-3. Multiple Generators in Isolated Operation with Tie-Breaker

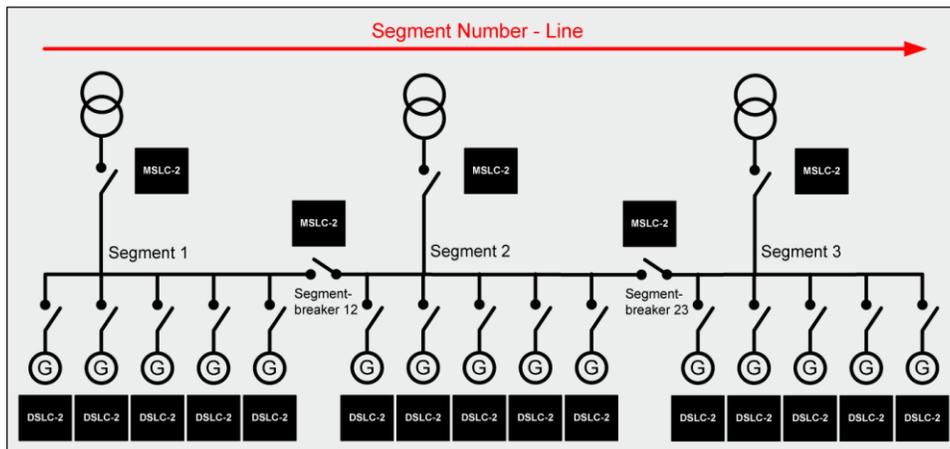


Figure 3-4. Multiple Generators in Parallel Operation with Multiple Utility Ties and Tie-Breakers

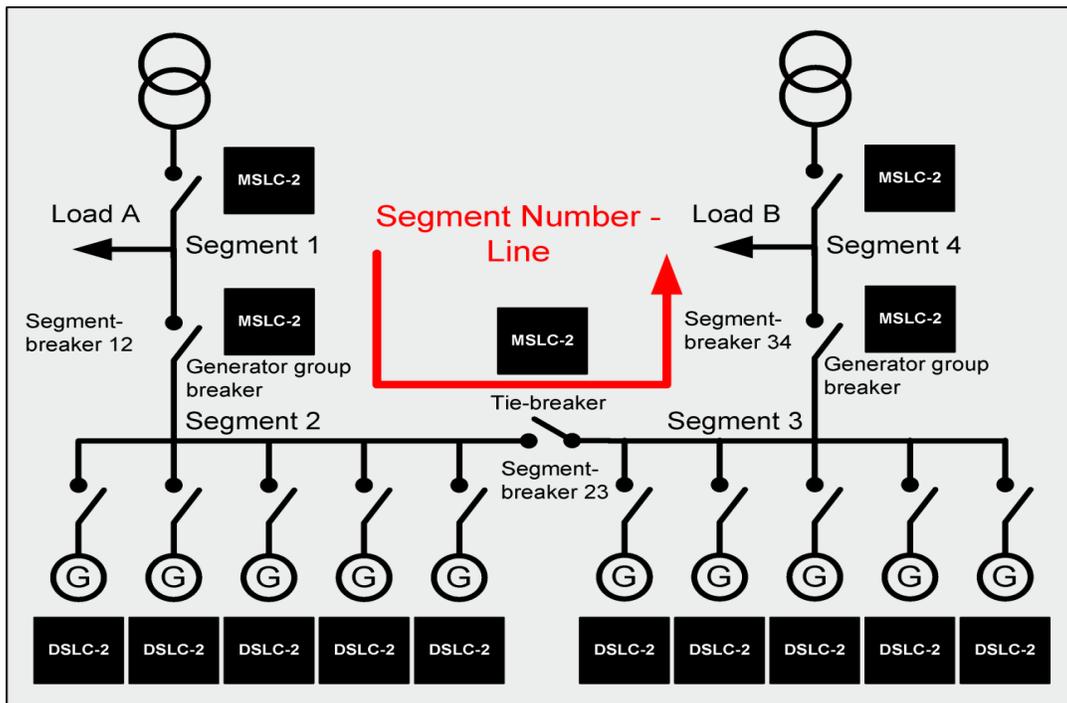


Figure 3-5. Isolated / Utility Parallel Operation with Multiple Generators, Tie-Breakers and Generator Group Breaker

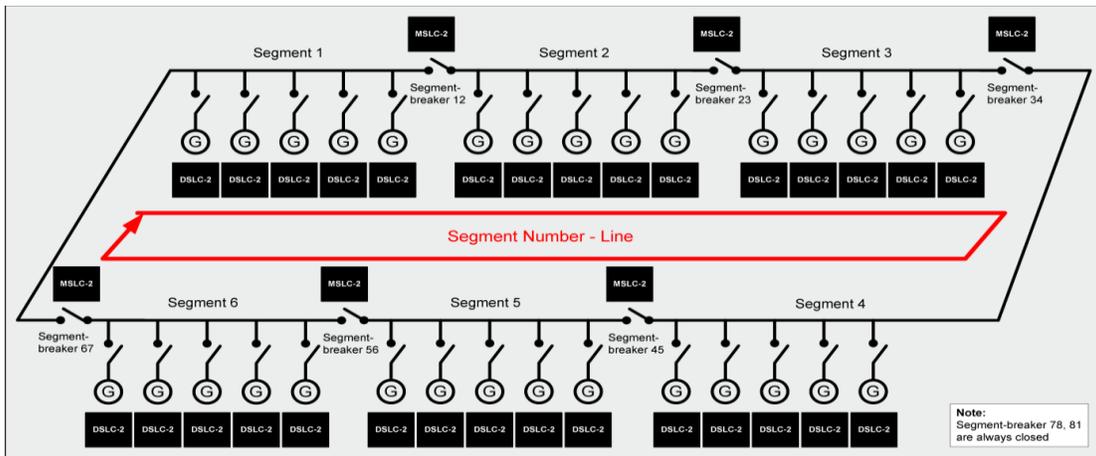


Figure 3-6. Isolated Operation with Multiple Generators and Tie Breakers (Ring Option)

Once installed, the DSLCL-2 manuals can be used for reference to help in the set-up and configuration of the DSLCL-2. The following manuals are available on the Woodward website at www.woodward.com.

- DSLCL Manual – 02007
- MSCL Manual – 02021
- DSLCL-2 Manual – 37443
- MSCL-2 Manual – 37444

Chapter 4.

Product Support and Service Options

Product Support Options

If you are experiencing problems with the installation, or unsatisfactory performance of a Woodward product, the following options are available:

1. Consult the troubleshooting guide in the manual.
2. Contact the **OE Manufacturer or Packager** of your system.
3. Contact the **Woodward Business Partner** serving your area.
4. Contact Woodward technical assistance via email (EngineHelpDesk@Woodward.com) with detailed information on the product, application, and symptoms. Your email will be forwarded to an appropriate expert on the product and application to respond by telephone or return email.
5. If the issue cannot be resolved, you can select a further course of action to pursue based on the available services listed in this chapter.

OEM or Packager Support: Many Woodward controls and control devices are installed into the equipment system and programmed by an Original Equipment Manufacturer (OEM) or Equipment Packager at their factory. In some cases, the programming is password-protected by the OEM or packager, and they are the best source for product service and support. Warranty service for Woodward products shipped with an equipment system should also be handled through the OEM or Packager. Please review your equipment system documentation for details.

Woodward Business Partner Support: Woodward works with and supports a global network of independent business partners whose mission is to serve the users of Woodward controls, as described here:

- A **Full-Service Distributor** has the primary responsibility for sales, service, system integration solutions, technical desk support, and aftermarket marketing of standard Woodward products within a specific geographic area and market segment.
- An **Authorized Independent Service Facility (AISF)** provides authorized service that includes repairs, repair parts, and warranty service on Woodward's behalf. Service (not new unit sales) is an AISF's primary mission.
- A **Recognized Engine Retrofitter (RER)** is an independent company that does retrofits and upgrades on reciprocating gas engines and dual-fuel conversions, and can provide the full line of Woodward systems and components for the retrofits and overhauls, emission compliance upgrades, long term service contracts, emergency repairs, etc.

A current list of Woodward Business Partners is available at www.woodward.com/directory.

Product Service Options

Depending on the type of product, the following options for servicing Woodward products may be available through your local Full-Service Distributor or the OEM or Packager of the equipment system.

- Replacement/Exchange (24-hour service)
- Flat Rate Repair
- Flat Rate Remanufacture

Replacement/Exchange: Replacement/Exchange is a premium program designed for the user who is in need of immediate service. It allows you to request and receive a like-new replacement unit in minimum time (usually within 24 hours of the request), providing a suitable unit is available at the time of the request, thereby minimizing costly downtime.

This option allows you to call your Full-Service Distributor in the event of an unexpected outage, or in advance of a scheduled outage, to request a replacement control unit. If the unit is available at the time of the call, it can usually be shipped out within 24 hours. You replace your field control unit with the like-new replacement and return the field unit to the Full-Service Distributor.

Flat Rate Repair: Flat Rate Repair is available for many of the standard mechanical products and some of the electronic products in the field. This program offers you repair service for your products with the advantage of knowing in advance what the cost will be.

Flat Rate Remanufacture: Flat Rate Remanufacture is very similar to the Flat Rate Repair option, with the exception that the unit will be returned to you in "like-new" condition. This option is applicable to mechanical products only.

Returning Equipment for Repair

If a control (or any part of an electronic control) is to be returned for repair, please contact your Full-Service Distributor in advance to obtain Return Authorization and shipping instructions.

When shipping the item(s), attach a tag with the following information:

- return number;
- name and location where the control is installed;
- name and phone number of contact person;
- complete Woodward part number(s) and serial number(s);
- description of the problem;
- instructions describing the desired type of repair.

Packing a Control

Use the following materials when returning a complete control:

- protective caps on any connectors;
- antistatic protective bags on all electronic modules;
- packing materials that will not damage the surface of the unit;
- at least 100 mm (4 inches) of tightly packed, industry-approved packing material;
- a packing carton with double walls;
- a strong tape around the outside of the carton for increased strength.

NOTICE

To prevent damage to electronic components caused by improper handling, read and observe the precautions in Woodward manual 82715, *Guide for Handling and Protection of Electronic Controls, Printed Circuit Boards, and Modules*.

Replacement Parts

When ordering replacement parts for controls, include the following information:

- the part number(s) (XXXX-XXXX) that is on the enclosure nameplate;
- the unit serial number, which is also on the nameplate.

Engineering Services

Woodward's Full-Service Distributors offer various Engineering Services for our products. For these services, you can contact the Distributor by telephone or by email.

- Technical Support
- Product Training
- Field Service

Technical Support is available from your equipment system supplier, your local Full-Service Distributor, or from many of Woodward's worldwide locations, depending upon the product and application. This service can assist you with technical questions or problem solving during the normal business hours of the Woodward location you contact.

Product Training is available as standard classes at many Distributor locations. Customized classes are also available, which can be tailored to your needs and held at one of our Distributor locations or at your site. This training, conducted by experienced personnel, will assure that you will be able to maintain system reliability and availability.

Field Service engineering on-site support is available, depending on the product and location, from one of our Full-Service Distributors. The field engineers are experienced both on Woodward products as well as on much of the non-Woodward equipment with which our products interface.

For information on these services, please contact one of the Full-Service Distributors listed at www.woodward.com/directory.

Contacting Woodward's Support Organization

For the name of your nearest Woodward Full-Service Distributor or service facility, please consult our worldwide directory at www.woodward.com/directory, which also contains the most current product support and contact information.

You can also contact the Woodward Customer Service Department at one of the following Woodward facilities to obtain the address and phone number of the nearest facility at which you can obtain information and service.

Products Used in Electrical Power Systems	
<u>Facility</u>	<u>Phone Number</u>
Brazil	+55 (19) 3708 4800
China	+86 (512) 6762 6727
Germany:	
Kempen	+49 (0) 21 52 14 51
Stuttgart	+49 (711) 78954-510
India	+91 (124) 4399500
Japan	+81 (43) 213-2191
Korea	+82 (51) 636-7080
Poland	+48 12 295 13 00
United States	+1 (970) 482-5811

Products Used in Engine Systems	
<u>Facility</u>	<u>Phone Number</u>
Brazil	+55 (19) 3708 4800
China	+86 (512) 6762 6727
Germany	+49 (711) 78954-510
India	+91 (124) 4399500
Japan	+81 (43) 213-2191
Korea	+82 (51) 636-7080
The Netherlands	+31 (23) 5661111
United States	+1 (970) 482-5811

Products Used in Industrial Turbomachinery Systems	
<u>Facility</u>	<u>Phone Number</u>
Brazil	+55 (19) 3708 4800
China	+86 (512) 6762 6727
India	+91 (124) 4399500
Japan	+81 (43) 213-2191
Korea	+82 (51) 636-7080
The Netherlands	+31 (23) 5661111
Poland	+48 12 295 13 00
United States	+1 (970) 482-5811

Technical Assistance

If you need to contact technical assistance, you will need to provide the following information. Please write it down here before contacting the Engine OEM, the Packager, a Woodward Business Partner, or the Woodward factory:

General

Your Name _____

Site Location _____

Phone Number _____

Fax Number _____

Prime Mover Information

Manufacturer _____

Engine Model Number _____

Number of Cylinders _____

Type of Fuel (gas, gaseous, diesel, dual-fuel, etc.) _____

Power Output Rating _____

Application (power generation, marine, etc.) _____

Control/Governor Information

Control/Governor #1

Woodward Part Number & Rev. Letter _____

Control Description or Governor Type _____

Serial Number _____

Control/Governor #2

Woodward Part Number & Rev. Letter _____

Control Description or Governor Type _____

Serial Number _____

Control/Governor #3

Woodward Part Number & Rev. Letter _____

Control Description or Governor Type _____

Serial Number _____

Symptoms

Description _____

If you have an electronic or programmable control, please have the adjustment setting positions or the menu settings written down and with you at the time of the call.

Revision History

We appreciate your comments about the content of our publications.

Send comments to: icinfo@woodward.com

Please reference publication **35068**.



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PO Box 1519, Fort Collins CO 80522-1519, USA
1041 Woodward Way, Fort Collins CO 80524, USA
Phone +1 (970) 482-5811

Email and Website—www.woodward.com

Woodward has company-owned plants, subsidiaries, and branches, as well as authorized distributors and other authorized service and sales facilities throughout the world.

Complete address / phone / fax / email information for all locations is available on our website.