DMS

DDS Digital Multifunctional System

Multifunction protection, control and measurement.

Features and Benefits

- Advanced 16-bit multi-microprocessor based
- Operate as DDS system distributed field units
- Drawout modules for serviceability
- Separate modules for protection and control
- Analog and digital inputs

Applications

- General purpose protection and control for electrical power systems
- Perform protection, control, measuring and monitoring functions for substation bay
- Capacitor bank protection
- NEW enerVista.com compatible (see page 275)

Protection and Control

- Overcurrent protection for phase, ground, instantaneous, directional phase, and negative sequence
- Built-in interlocking functions
- Voltage and frequency protection units
- Reclosure

Monitoring and Metering

- Monitor up to seven switching devices, plus alarm monitoring and breaker health
- Event recording and oscillography

User Interfaces

- RS232, RS485, plastic or glass fiber optic ports
- ModBus® communication protocol available

Protection and Control

The DMS features a variety of advanced protection functions. Each protective function can be programmed independently to trip, trip after manual closing, or enable a reclosing.

Overcurrent Units

TOC and IOC for phase and ground with one instantaneous level are provided. TOC can be separately selected to follow Inverse, Very Inverse, Extremely Inverse curves or Definite Time.

For capacitor bank protection an additional current input is used to detect wye unbalance. A high sensitivity unit is added providing both TOC (51) and IOC (50) protection.

Directional Units

Directional supervision can be adjusted separately so that each overcurrent unit can become independently directional if desired.

Negative Sequence Overcurrent

This function measures the negative sequence component of a line or feeder to help limit load unbalance or detect extreme fault conditions. When applied to generator protection systems, the DMS helps avoid rotor heating caused by negative sequence currents.

Three-Phase Voltage

The three-phase over and undervoltage units react to phase-to-phase voltage values that are calculated from phase-to-ground voltages applied to the unit. Undervoltage is supervised by the breaker status and will not activate while the breaker is open.

Ground Overvoltage

The operating voltage can either be calculated as the sum of the three-phase voltage values or it may be provided through an independent voltage input. This function responds only to the fundamental frequency since the voltage input is filtered and the harmonics eliminated.

Frequency Functions

Over and underfrequency units are measured over a single-phase voltage (phase B).

Operations and Interlocks

The control sub-module allows the user to configure and perform up to 16 operations using GE-INTRO software. Two operations are predefined (Control Blocking and Control Unblocking) and the other 14 are fully configurable. The operation commands can be sent to the relay through local or remote communications and via digital inputs (conventional RTU).

Combinational Circuits

Four programmable combinational circuits provide "static" interlocks which allow the user to set actions related to different signals being received by the DMS unit. The circuits allow the DMS to remain active while those signals are as defined.

The user can program each circuit using logical AND, NOT and OR gates. The input of these gates can be selected from the 64 control states.

Configurable I/Os

All the inputs and outputs of the DMS are configurable, except for the trip and reclose contacts included in the power supply boards. Inputs and outputs may be configured with GE-INTRO software.

Monitoring and Metering

The DMS features advanced monitoring and metering functions which include:

Monitoring of Switching Equipment

DMS units monitor the status of switching equipment. When an operation (open or close) is performed on one of the monitored switches, the DMS system monitors the correct opening and closure by means of programmable timers.

Alarms

DMS units incorporate alarm monitoring and management functions. Up to 96 alarms can be configured in one DMS module (32 protection alarms, 48 control alarms and 16 communication alarms). Alarms are defined by different protection and control statuses. It is possible to create logical combinations of several statuses to define an alarm.

Breaker Health Monitor

For each operation, DMS units calculate and store the cumulative values for I^2t on each of the three phases. If the rated current is not exceeded, as in the case of a manual opening command with no fault current, the relay stores the rated current value instead of the measured value.

The value I^2t is accumulated and stored independently for each phase. These values can be accessed via local MMI or GE-LOCAL communications software.

Supervision of Trip and Closing Circuits

As an option, the DMS can have two complete supervision circuits for breaker trip and closing coils. These supervision inputs monitor both the battery voltage level and the continuity of the trip and/or closing circuits, applying and monitoring the current flow through those circuits.

Event Recording

The DMS keeps a record of the last 150 events. These events can be generated in the protection sub-module by a trip or pickup of one of the different protection units, self-check or monitoring function alarms, setting changes, and more.

Oscillography

DMS units store up to four oscillography records with a resolution of 16 samples per

cycle. Each oscillography record has a maximum capacity of 66 cycles. The number of pre-fault cycles can be selected from two to 10 cycles. The information stored in each record includes all analog waveforms available in the unit plus digital status information.

Metering

DMS units perform accurate metering of I, I_2, V, VA, VAR, kW, kVAR, kWh, kVARh, cos phi, and f.

These measurements can be accessed directly on the two line LCD on the front of the equipment, the graphical LCD (if this option is requested), or via the GE-LOCAL communication software.

There are two possibilities regarding metering accuracy: a basic unit and an enhanced option that gives 1% accuracy in voltage and current.

User Interfaces

The DMS is easily accessed locally or remotely by the user through:

Local HMIs

The local HMI is developed through two keyboard/display sets, one for protection functions and another for control functions.

Protection HMI

The protection HMI allows access to all the information available in the protection system. The user can view and modify settings, display status and measurement information, command protection operations, and more.

Control HMI

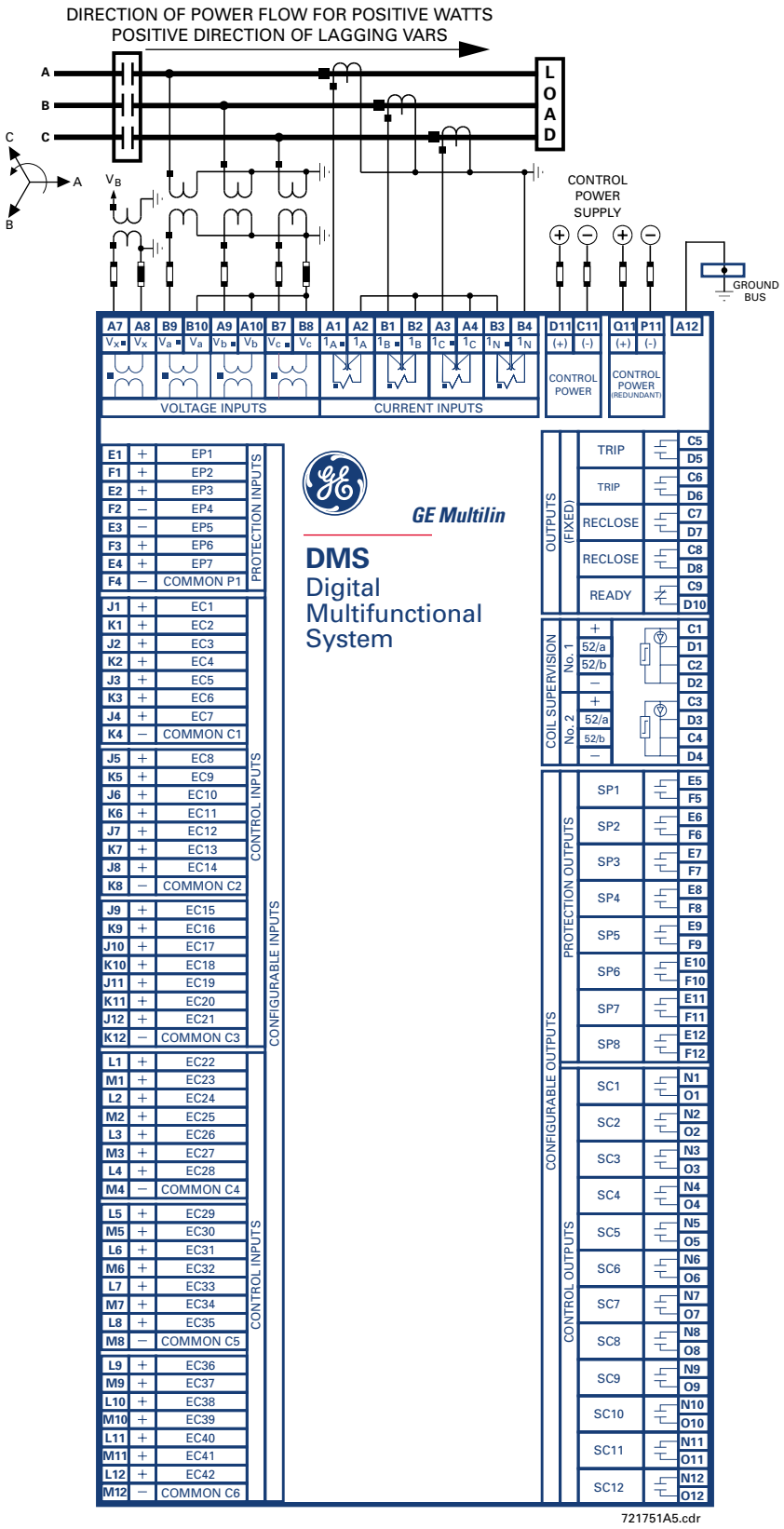
The control HMI displays bay, alarm, measurement, and I/O status screens.

Communications

The DMS contains an RS232 front port for local communication and a rear port for remote communication (where the Level 2 system is connected). The rear port can be RS232, RS485 or Fiber Optic type.

Typical Wiring

*(for models DMS3****48J*00**)*



Both ports allow communication using the GE-NESIS software.

Software

Two Windows®-based software packages are included with the DMS:

- GE-LOCAL – allows manipulation of the unit's settings, alarms, measurements and statuses, and retrieval of event and oscillographic records
- GE-INTRO – allows configuration of inputs and outputs, alarms, operations and interlockings and configurable screens in the graphic display

Optionally, GE-OSC enables the user to analyze the oscillography records.

These software packages are part of the GE-NESIS software (GE NETwork Substation Integration System) used by the DDS system.

DMS Guideform Specifications

For an electronic version of the DMS guideform specifications, please visit: www.GEindustrial.com/Multilin/specs, fax your request to 905-201-2098 or email to literature.multilin@indsys.ge.com.

Ordering

DMS	*	*	**	*	*	*	*	*	***	*	*	
DMS												Digital distribution system
	2											Control functionality
	3											Protection and control functionality
		C										Capacitor bank (only model 3)
		L										Line application (only model 3)
		S										Auxiliary services application (only model 2)
			**									Application variant (see table 1)
				*								Ranges depend on model
					0							RS232 communication
					1							1 mm plastic fiber optic communication
					2							62.5/125 glass fiber optic communication
					3							Point to point RS485 communication
						*						Protection inputs and outputs depend on model
							*					Control inputs and outputs depend on model
								G				48 – 125 VDC single source auxiliary voltage
								H				110 – 250 VDC single source auxiliary voltage
								J				48 – 125 VDC redundant source auxiliary voltage
								M				110 – 250 VDC redundant source auxiliary voltage
									000			Power measurement by pulse count
									100			Direct power measurement (1% error in V, I, and 2% in P, Q, Power)
										A		M-LINK communications protocol
										B		M-LINK and ModBus® RTU communications protocol
											–	Spanish language
											I	English language

	DMS3 (Protection)				Capacitor Bank	DMS2
Variant	L1	L3	L4	L7	C1	S2
Protection						
50/51	●	●	●	●	●	
50N/51N	●	●		●	●	
50G/51G					●	
46	●		●			
67	●	●	●		●	
67N	●	●			●	
67N isolated			●			
27		●		●	●	
59F				●	●	
81		●		●		
Recloser	●	●	●		●	
Control						
Command	●	●	●	●	●	●
Interlockings	●	●	●	●	●	●
25	●				●	
Metering						
Phase current	●	●	●	●	●	●
Ground current	●	●	●	●	●	●
2nd ground current					●	
Phase voltage	●	●	●	●	●	●
Busbar 1 voltage	●	●				
Negative sequence	●		●			
Power	●	●	●	●	●	●
Cos φ	●	●	●	●	●	●
Frequency	●	●	●	●	●	
Monitoring						
Breaker status	●	●	●	●	●	●
Coupler status	●	●	●	●	●	●
Events	●	●	●	●	●	●
Breaker maintenance	●	●	●	●	●	
Coil supervision	●	●	●	●	●	
Analysis						
Events	●	●	●	●	●	●
Oscillography	●	●	●	●	●	
Others						
Multiple tables	●	●	●	●	●	●
Cold load pick-up	●	●	●	●	●	
Time synchronize	●	●	●	●	●	●