

Section 6 Decision-Maker 3500 Generator Set Controller

6.1 Specifications

The Decision-Maker® 3500 controller's Modbus® communication capability:

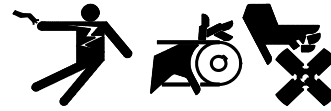
- Supports industry-standard Modbus® RTU protocol.
- Can use Modbus® TCP protocol with the addition of a Modbus/Ethernet converter.
- Uses RS-485 connections to connect to a Modbus® master singly or over an RS-485 network.
- Connects to an Ethernet network using a Modbus/Ethernet converter.
- Uses standard baud rates of 9600, 19200, 38400, or 57600.



Figure 6-1 Decision-Maker® 3500 Controller

6.2 Hardware Connections

⚠ WARNING



**Accidental starting.
Can cause severe injury or death.**

Disconnect the battery cables before working on the generator set. Remove the negative (-) lead first when disconnecting the battery. Reconnect the negative (-) lead last when reconnecting the battery.

Disabling the generator set. Accidental starting can cause severe injury or death. Before working on the generator set or equipment connected to the set, disable the generator set as follows: (1) Press the generator set off/reset button to shut down the generator set. (2) Disconnect the power to the battery charger, if equipped. (3) Remove the battery cables, negative (-) lead first. Reconnect the negative (-) lead last when reconnecting the battery. Follow these precautions to prevent the starting of the generator set by the remote start/stop switch.

Circuit isolation is recommended for installations that may be exposed to electrical noise. See Appendix B, Noise and Wiring Practices.

Use the following procedure to connect the hardware. Observe the safety precautions. Also see the network connection diagrams in TT-1405.

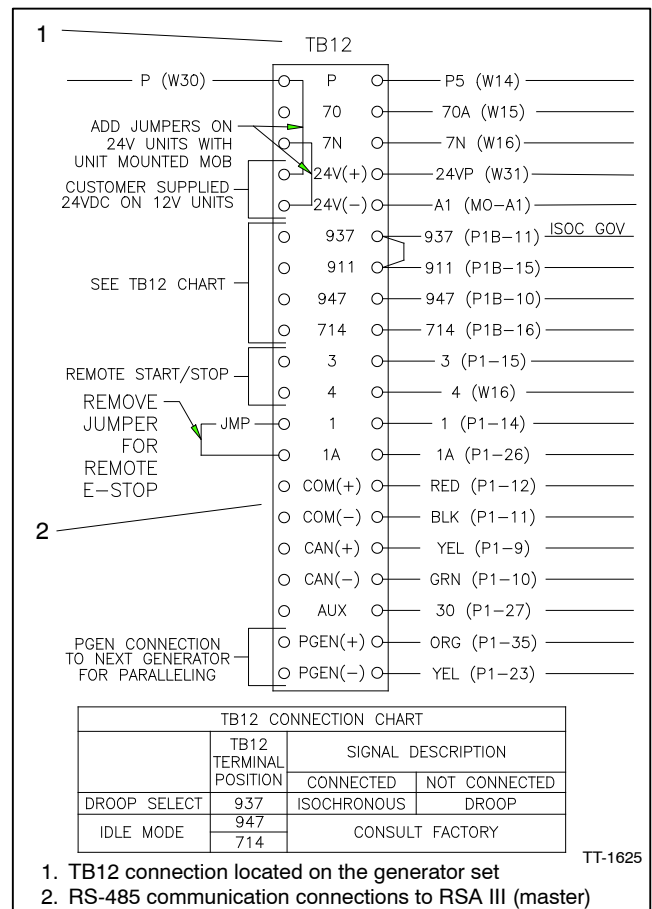
Ethernet connections require the use of a Modbus/Ethernet converter module. See TT-1405 for Modbus/Ethernet converter connection and setup information.

Decision-Maker 3500 Connection Procedure

1. Press the OFF button on the controller.
2. Disconnect the power to the battery charger, if equipped.
3. Disconnect the generator set engine starting battery(ies), negative (-) lead first.
4. Turn off and disconnect the power to all devices in the system.
5. Connect to communication port on TB12 (located in the junction box) as shown in Figure 6-2.
6. Verify that the controller is OFF.
7. Reconnect the generator set engine starting battery, negative (-) lead last.
8. Reconnect power to the battery charger, if equipped.

6.3 Controller Setup

Use Kohler® SiteTech™ software and a personal computer connected to the controller's USB port to configure the controller's communication parameters shown in Figure 6-3. See TP-6701, SiteTech Software Operation Manual, for instructions.



Note: Use Belden #9844 or equivalent

TB12 Connector	Circuit Board Designation	Wire Designation
COM (+)	(+)	White
COM (-)	(-)	Black
Do not connect at TB12 or DEC 3500, tape to insulate unused end.		Shield
Note: When using RS-485 communication cable, connect the "shield" wire at the RSA III P27 connection but not at the DEC 3500 controller/TB12 connection.		

Figure 6-2 Connection Details

SiteTech Group	Parameter	Setting
Modbus	Address	Use a unique network address between 1 and 247 for each unit. Use 1 for a single connection. Do not use 0 (zero).
	Baud rate	9600, 19200, 38400, or 57600. Must match the PC and all devices in the system.

Figure 6-3 Decision-Maker 3500 Communication Parameters

6.4 Modbus Registers

This section contains Modbus® registers for the Decision-Maker® 3500 controller. Refer to Section 1.3 for definitions of terms and symbols used in the register tables.

Time delays, setpoints, inputs and outputs, and other user-defined parameters are entered through the controller keypad or SiteTech™ software. Refer to the operation manuals for the controller or software for instructions. See the List of Related Materials for document part numbers.

Note: FFC0 = Unsupported register.

Register	Parameter	Write Access	Units	Data Type	Type/Notes
400001	RMS Generator Voltage L1-L2	RO	% X 100	UINT	% of Rated VAC
400002	RMS Generator Voltage L2-L3	RO	% X 100	UINT	% of Rated VAC
400003	RMS Generator Voltage L3-L1	RO	% X 100	UINT	% of Rated VAC
400004	RMS Generator Voltage Line to Line Average	RO	% X 100	UINT	% of Rated VAC
400005	RMS Generator Voltage L1-N	RO	% X 100	UINT	% of Rated VAC
400006	RMS Generator Voltage L2-N	RO	% X 100	UINT	% of Rated VAC
400007	RMS Generator Voltage L3-N	RO	% X 100	UINT	% of Rated VAC
400008	RMS Generator Voltage Line to Neutral Average	RO	% X 100	UINT	% of Rated VAC
400009	RMS Generator Current L1	RO	% X 100	UINT	% of Rated Current (RMS)
400010	RMS Generator Current L2	RO	% X 100	UINT	% of Rated Current (RMS)
400011	RMS Generator Current L3	RO	% X 100	UINT	% of Rated Current (RMS)
400012	RMS Generator Current Average	RO	% X 100	UINT	% of Rated Current (RMS)
400013	Generator Frequency	RO	X 100	UINT	Hz
400014	Generator Real Power L1	RO	% X 100	INT	% of Rated kW (Full Real Load = 33.3%)
400015	Generator Real Power L2	RO	% X 100	INT	% of Rated kW (Full Real Load = 33.3%)
400016	Generator Real Power L3	RO	% X 100	INT	% of Rated kW (Full Real Load = 33.3%)
400017	Generator Total Real Power	RO	% X 100	INT	% of Rated kW
400018	Generator Reactive Power L1	RO	% X 100	INT	% of Rated kW (Full Reactive Load = 25%)
400019	Generator Reactive Power L2	RO	% X 100	INT	% of Rated kW (Full Reactive Load = 25%)
400020	Generator Reactive Power L3	RO	% X 100	INT	% of Rated kW (Full Reactive Load = 25%)
400021	Generator Reactive Power	RO	% X 100	INT	% of Rated kW (Full Reactive Load = 75%)
400022	Generator Apparent Power L1	RO	% X 100	UINT	% of Rated kW (Full Alternator Load = 41.7%)
400023	Generator Apparent Power L2	RO	% X 100	UINT	% of Rated kW (Full Alternator Load = 41.7%)
400024	Generator Apparent Power L3	RO	% X 100	UINT	% of Rated kW (Full Alternator Load = 41.7%)
400025	Generator Apparent Power	RO	% X 100	UINT	% of Rated kW (Full Alternator Load = 125%)
400026	Generator Power Factor L1	RO	pF X 100	INT	Generator Output Power Factor (- = reverse Power)

Register	Parameter	Write Access	Units	Data Type	Type/Notes
400027	Generator Power Factor L2	RO	pF X 100	INT	Generator Output Power Factor (- = reverse Power)
400028	Generator Power Factor L3	RO	pF X 100	INT	Generator Output Power Factor (- = reverse Power)
400029	Generator Power Factor	RO	pF X 100	INT	Generator Output Power Factor (- = reverse Power)
400030	Generator Phase Angle Voltage L1-Voltage L2	RO	° X 10	INT	Phase difference in Degrees
400031	Generator Phase Angle Voltage L1-Voltage L3	RO	° X 10	INT	Phase difference in Degrees
400032	Generator Phase Angle Voltage L1-Current L1	RO	° X 10	INT	Phase difference in Degrees
400033	Generator Phase Angle Voltage L2-Current L2	RO	° X 10	INT	Phase difference in Degrees
400034	Generator Phase Angle Voltage L3-Current L3	RO	° X 10	INT	Phase difference in Degrees
400035	Phase Rotation	RO	UNIQUE	PHASE_ROT	0 = Unknown, 1 = ABC, 2 = CBA, 3 = Single-Phase
400036	Generator L1 Current Lead/Lag	RO	UNIQUE	LEAD/LAG	0 = Invalid, 1 = Leading, 2 = Lagging
400037	Generator L2 Current Lead/Lag	RO	UNIQUE	LEAD/LAG	0 = Invalid, 1 = Leading, 2 = Lagging
400038	Generator L3 Current Lead/Lag	RO	UNIQUE	LEAD/LAG	0 = Invalid, 1 = Leading, 2 = Lagging
400039	Generator Average Current Lead/Lag	RO	UNIQUE	LEAD/LAG	0 = Invalid, 1 = Leading, 2 = Lagging
400040 thru 400043	RESERVED for factory use				
400044	RMS Bus Voltage L1-L2	RO	% X 100	UINT	% of Rated VAC
400045	RMS Bus Voltage L2-L3	RO	% X 100	UINT	% of Rated VAC
400046	RMS Bus Voltage L3-L1	RO	% X 100	UINT	% of Rated VAC
400047	RMS Bus Voltage Average Line to Line	RO	% X 100	UINT	% of Rated VAC
400048	Total Bus Real Power	RO	% X 100	INT	% of Rated kW
400049	Total Bus Reactive Power	RO	% X 100	INT	% of Rated kW (Full Reactive Load = 75%)
400050	Bus Frequency	RO	X 100	UINT	Hz
400051	Bus Phase Rotation	RO	UNIQUE	PHASE_ROT	0 = Unknown, 1 = ABC, 2 = CBA, 3 = Single-Phase
400052	Phase Angle Generator Voltage L1-Bus Voltage L1	RO	° X 10	INT	Phase difference in Degrees
400053	Speed Bias	RO	% X 100	INT	Adjustment provided to Speed (100% = 10% change in speed)
400054	Voltage Bias	RO	% X 100	INT	Adjustment provided to Voltage (100% = 10% change in voltage)
400055 thru 400058	RESERVED for factory use				

Register	Parameter	Write Access	Units	Data Type	Type/Notes
400059	Engine Oil Pressure	RO	kPA X 10	UINT	kPA
400060	Engine Coolant Temperature	RO	°C X 10	INT	°C
400061	Engine Speed	RO	RPM	UINT	RPM
400062	Battery Voltage	RO	V X 10	UINT	V
400063	Controller Temperature	RO	°C X 10	INT	°C
400064	Engine Fuel Pressure	RO	kPA / 100	UINT	kPA
400065	Engine Fuel Temperature	RO	°C X 10	INT	°C
400066	Engine Fuel Rate	RO	liters / hour	UINT	l/hr
400067	Fuel Used During Last Run	RO	liters	UINT	l
400068	Engine Coolant Pressure	RO	kPA X 10	UINT	kPA
400069	Engine Coolant Level	RO	% X 100	UINT	%
400070	Engine Oil Temperature	RO	°C X 10	INT	°C
400071	Engine Oil Level	RO	% X 100	UINT	%
400072	Engine Crankcase Pressure	RO	kPA X 10	UINT	kPA
400073	Intake Air Temperature	RO	°C X 10	INT	°C
400074	Intake Air Pressure	RO	kPA	UINT	kPA
400075	ECM Ambient Temperature	RO	°C X 10	INT	°C
400076	ECM Battery Voltage	RO	V X 10	UINT	V
400077	ECM Model	RO	UNIQUE	UINT	
400078	ECM Fault Codes	RO	UNIQUE	UINT	
400079 thru 400082	RESERVED for factory use				
400083	Total Runtime Hours LW	RO	h X 10	UDINT	h
400084	Total Runtime Hours HW	RO			
400085	Total Runtime Loaded Hours LW	RO	h X 10	UDINT	h
400086	Total Runtime Loaded Hours HW	RO			
400087	Total Runtime Unloaded Hours LW	RO	h X 10	UDINT	h
400088	Total Runtime Unloaded Hours HW	RO			
400089	Total Runtime kW Hours LW	RO	kWh	UDINT	kWh
400090	Total Runtime kW Hours HW	RO			
400091	Code Version MSB = Minor, LSB = Major	RO	UNIQUE		
400092	Code Version Build Number	RO	UNIQUE		
400093 thru 400096	RESERVED for factory use				
400097	LSB = Day, MSB = Month	RW	Day of Month, Month of Year	UINT	
400098	Year	RW	16 bit year (A.D.)	UINT	
400099	mSecond	RW	seconds X 1000	UINT	
400100	LSB = Minute, MSB = Hour	RW	Minutes past Hour, Hours past Midnight	UINT	
400101 thru 400104	RESERVED for factory use				
400105	System Voltage	RW	V	UINT	V
400106	System Frequency	RW	Hz	UINT	Hz
400107	System Phase Connection	RW	UNIQUE	Voltage Phase Connection	0 = Single-Phase, 1 = DogLeg, 2 = Wye, 3 = Delta
400108	Rated Current	RO	A	UINT	A
400109	Genset kW Rating	RO	kW X 10	UINT	kW
400110	System Battery Voltage	RW	V	UINT	V

Register	Parameter	Write Access	Units	Data Type	Type/Notes
400111	Engine Run Speed	RO	RPM X 1	UINT	RPM
400112 thru 400512	RESERVED for factory use, not readable				
400513	Total Number of Starts	RO		UINT	
400514	Total Runtime Hours Since Maintenance LW	RO	hr X 10	UDINT	hr
400515	Total Runtime Hours Since Maintenance HW	RO			
400516	Total Loaded Hours Since Maintenance LW	RO	hr X 10	UDINT	hr
400517	Total Loaded Hours Since Maintenance HW	RO			
400518	Total kW Hours Since Maintenance LW	RO	kWh	UDINT	kWh
400519	Total kW Hours Since Maintenance LW	RO			
400520	Last Maintenance Day, Month	RO	Day of Month, Month of Year	UINT	
400521	Last Maintenance Year	RO	16 bit year (A.D.)	UINT	
400522	Last Maintenance mSecond	RO	seconds X 1000	UINT	
400523	Last Maintenance Minute, Hour	RO	Minutes past Hour, Hours past Midnight	UINT	
400524	Operating Days Since Last Maintenance	RO	days	UINT	days
400525	Number of Starts Since Last Maintenance	RO		UINT	
400526	Last Start Day, Month	RO	Day of Month, Month of Year	UINT	
400527	Last Start Year	RO	16 bit year (A.D.)	UINT	
400528	Last Start mSecond	RO	seconds X 1000	UINT	
400529	Last Start Minute, Hour	RO	Minutes past Hour, Hours past Midnight	UINT	
400530 thru 400604	RESERVED for factory use, not readable				
400605	Ecm Start Delay	RW	sec	UINT	
400606	Engine Start Delay	RW	sec	UINT	
400607	Starting Aid Delay	RW	sec	UINT	
400608	Crank On Time Delay	RW	sec	UINT	
400609	Crank Pause Time Delay	RW	sec	UINT	
400610	Engine Cooldown Time Delay	RW	sec	UINT	
400611	OverVoltage Time Delay	RW	sec	UINT	
400612	UnderVoltage Time Delay	RW	sec	UINT	
400613	RESERVED for factory use	RO	sec	UINT	
400614	Low Battery Voltage Delay	RW	sec	UINT	
400615	High Battery Voltage Delay	RW	sec	UINT	
400616	Speed Adjust	RW		UINT	
400617	Voltage Adjust	RW	% X 100	UINT	% of Rated VAC
400618	Warmed Up Temperature	RO	°C	INT	°C
400619	Cooled Down Temperature	RO	°C	INT	°C
400620	Engine Low Coolant Temperature Warning Limit	RO	°C X 10	INT	°C
400621	Engine High Coolant Temperature Warning Limit	RO	°C X 10	INT	°C
400622	RESERVED for factory use	RO	°C X 10	INT	°C
400623	Engine High Coolant Temperature Shutdown Limit	RO	°C X 10	INT	°C
400624	Engine Low Oil Pressure Warning Limit	RO	kPA X 10	UINT	kPA

Register	Parameter	Write Access	Units	Data Type	Type/Notes
400625	Engine Low Oil Pressure Shutdown Limit	RO	kPA X 10	UINT	kPA
400626	RESERVED for factory use	RO	%	UINT	% of Rated kW
400627	OverVoltage Level	RW	%	UINT	% of Rated VAC
400628	UnderVoltage Level	RW	%	UINT	% of Rated VAC
400629	OverFrequency Level	RW	%	UINT	% of Rated Hz
400630	UnderFrequency Level	RW	%	UINT	% of Rated Hz
400631	UnderSpeed Level	RW	%	UINT	% of Engine Run Speed
400632	OverSpeed Level	RW	%	UINT	% of Engine Run Speed
400633	Low Battery Voltage Warning Level	RW	%	UINT	% of System Battery Voltage
400634	High Battery Voltage Warning Level	RW	%	UINT	% of System Battery Voltage
400635	Number of Crank Cycles	RW		UINT	
400636 thru 400638	RESERVED for factory use *				
400639	Volts/Hz Cut In Frequency	RW	Hz X 10	UINT	Hz
400640	Volts/Hz Slope	RW	%	UINT	Volts/Hz
400641	Voltage Regulator Gain	RW		UINT	
400642	Voltage Normal Ramp Rate †	RW		UINT	
400643	RESERVED for factory use	RW		UINT	
400644	Cooldown Temperature Override	RW		UINT	
400645	Genset Controller Date Format	RW		UNIQUE	DateFormat 0 = MM-DD-YY, 1 = DD-MM-YY
400646	Genset Controller Time Format †	RW		UNIQUE	TimeFormat 0 = 12 Hr, 1 = 24 Hr
400647	Post Heat Delay Seconds †	RW	Sec	UINT	Post Heat Time Delay
400648	Starting Aid Temp Limit †	RW	°C	INT	Coolant temp threshold
400649	Engine Idle Duration †	RW	Sec	UINT	Coolant temp threshold
400650 thru 400659	RESERVED for factory use *				
400660	Overpower Protective Relay Level	RW		UINT	% of Rated Power
400661	Overpower Protective Relay Time Delay	RW		UINT	sec X 10
400662	Reverse Power Protective Relay Level	RW		UINT	% of Rated Power
400663	Reverse Power Protective Relay Time Delay	RW		UINT	sec X 10
400664	OverVoltage Protective Relay Level	RW		UINT	% of Rated Voltage
400665	OverVoltage Protective Relay Time Delay	RW		UINT	sec X 10
400666	UnderVoltage Protective Relay Level	RW		UINT	% of Rated Voltage
400667	UnderVoltage Protective Relay Time Delay	RW		UINT	sec X 10
400668	OverFrequency Protective Relay Level	RW		UINT	% of Rated Frequency
400669	OverFrequency Protective Relay Time Delay	RW		UINT	sec X 10
400670	UnderFrequency Protective Relay Level	RW		UINT	% of Rated Frequency
400671	UnderFrequency Protective Relay Time Delay	RW		UINT	sec X 10
400672	Loss of Field Protective Relay Level	RW		UINT	% of Rated kVAR (Typically 75% of Rated kW)
400673	Loss of Field Protective Relay Time Delay	RW		UINT	sec X 10
400674	OverCurrent Protective Relay Level	RW		UINT	% of Rated Current
400675	OverCurrent Protective Relay Time Delay	RW		UINT	sec X 10
400676	OverPower Shutdown Level	RO		UINT	% of Rated Power (102/112% kW Overload)
400677	OverPower Shutdown Time Delay	RO		UINT	sec X 1 (102/112% kW Overload)
400678	Synch Check Voltage Window †	RW		UINT	% X 100
400679	Synch Check Frequency Window †	RW		UINT	Hz X 100
400680	Synch Check Phase Window †	RW		UINT	° X 100

Register	Parameter	Write Access	Units	Data Type	Type/Notes
400681	Synch Check Dwell Time †	RW		UINT	sec X 10
400682	BreakerTripToShutdownTime †	RW		UINT	sec X 10
400683 thru 400799	RESERVED for factory use				
400800	Gen Management Control Mode	RW ‡		UNIQUE	1 = Manual, 2 = Runtime, 3 = Fuel Level
400801	Gen Management Enabled	RW ‡		BOOL	
400802	Gen Management Order	RW ‡		UINT	
400803	Gen Management Start Percent	RW ‡	% X 10	UINT	
400804	Gen Management Stop Percent	RW ‡	% X 10	UINT	
400805	Gen Management Start Delay	RW ‡	s	UINT	
400806	Gen Management Stop Delay	RW ‡	s	UINT	
400807	Gen Management Start Accumulator LW	RO			
400808	Gen Management Start Accumulator HW	RO	% X 10000	UDINT	
400809	Gen Management Stop Accumulator LW	RO			
400810	Gen Management Stop Accumulator HW	RO	% X 10000	UDINT	
400811	Gen Management Start KW	RO	kW	UINT	
400812	Gen Management Stop KW	RO	kW	UINT	
400813	Gen Management Stable Delay	RW ‡	s	UINT	
400814	Gen Management Run Time Threshold	RW ‡	h X 10	UINT	
400815	Gen Management Fuel Difference Threshold	RW ‡	%	UINT	
400816	Gen Management Min Gens Online	RW ‡		UINT	
400817	Gen Management Min Load Shed Priority	RW ‡		UINT	
400818	Gen Management Stopped By Gen Mgmt	RO		BOOL	
400819	Gen Management Total Bus Capacity	RO	kW	UINT	
400820 thru 400894	RESERVED for factory use				
400895	Number of Active Events	RO		UINT	
400896	Active Event1 Level and FMI	RO		UINT	
400897	Active Event1 Object ID	RO		UINT	
400898	Active Event1 Event Id	RO		UINT	
400899	Active Event1 ParameterId	RO		UINT	
400900	Active Event2 Level and FMI	RO		UINT	
400901	Active Event2 Object ID	RO		UINT	
400902	Active Event2 Event Id	RO		UINT	
400903	Active Event2 ParameterId	RO		UINT	
400904	Active Event3 Level and FMI	RO		UINT	
400905	Active Event3 Object ID	RO		UINT	
400906	Active Event3 Event Id	RO		UINT	
400907	Active Event3 ParameterId	RO		UINT	
400908	Active Event4 Level and FMI	RO		UINT	
400909	Active Event4 Object ID	RO		UINT	
400910	Active Event4 Event Id	RO		UINT	
400911	Active Event4 ParameterId	RO		UINT	
400912	Active Event5 Level and FMI	RO		UINT	
400913	Active Event5 Object ID	RO		UINT	
400914	Active Event5 Event Id	RO		UINT	
400915	Active Event5 ParameterId	RO		UINT	
400916	Active Event6 Level and FMI	RO		UINT	
400917	Active Event6 Object ID	RO		UINT	
400918	Active Event6 Event Id	RO		UINT	
400919	Active Event6 ParameterId	RO		UINT	
400920	Active Event7 Level and FMI	RO		UINT	
400921	Active Event7 Object ID	RO		UINT	
400922	Active Event7 Event Id	RO		UINT	
400923	Active Event7 ParameterId	RO		UINT	

Register	Parameter	Write Access	Units	Data Type	Type/Notes
400924	Active Event8 Level and FMI	RO		UINT	
400925	Active Event8 Object ID	RO		UINT	
400926	Active Event8 Event Id	RO		UINT	
400927	Active Event8 ParameterId	RO		UINT	
400928	Active Event9 Level and FMI	RO		UINT	
400929	Active Event9 Object ID	RO		UINT	
400930	Active Event9 Event Id	RO		UINT	
400931	Active Event9 ParameterId	RO		UINT	
400932	Active Event10 Level and FMI	RO		UINT	
400933	Active Event10 Object ID	RO		UINT	
400934	Active Event10 Event Id	RO		UINT	
400935	Active Event10 ParameterId	RO		UINT	
400936	Active Event11 Level and FMI	RO		UINT	
400937	Active Event11 Object ID	RO		UINT	
400938	Active Event11 Event Id	RO		UINT	
400939	Active Event11 ParameterId	RO		UINT	
400940	Active Event12 Level and FMI	RO		UINT	
400941	Active Event12 Object ID	RO		UINT	
400942	Active Event12 Event Id	RO		UINT	
400943	Active Event12 ParameterId	RO		UINT	
400944	Active Event13 Level and FMI	RO		UINT	
400945	Active Event13 Object ID	RO		UINT	
400946	Active Event13 Event Id	RO		UINT	
400947	Active Event13 ParameterId	RO		UINT	
400948	Active Event14 Level and FMI	RO		UINT	
400949	Active Event14 Object ID	RO		UINT	
400950	Active Event14 Event Id	RO		UINT	
400951	Active Event14 ParameterId	RO		UINT	
400952	Active Event15 Level and FMI	RO		UINT	
400953	Active Event15 Object ID	RO		UINT	
400954	Active Event15 Event Id	RO		UINT	
400955	Active Event15 ParameterId	RO		UINT	
400956	Active Event16 Level and FMI	RO		UINT	
400957	Active Event16 Object ID	RO		UINT	
400958	Active Event16 Event Id	RO		UINT	
400959	Active Event16 ParameterId	RO		UINT	
400960	Active Event17 Level and FMI	RO		UINT	
400961	Active Event17 Object ID	RO		UINT	
400962	Active Event17 Event Id	RO		UINT	
400963	Active Event17 ParameterId	RO		UINT	
400964	Active Event18 Level and FMI	RO		UINT	
400965	Active Event18 Object ID	RO		UINT	
400966	Active Event18 Event Id	RO		UINT	
400967	Active Event18 ParameterId	RO		UINT	
400968	Active Event19 Level and FMI	RO		UINT	
400969	Active Event19 Object ID	RO		UINT	
400970	Active Event19 Event Id	RO		UINT	
400971	Active Event19 ParameterId	RO		UINT	
400972	Active Event20 Level and FMI	RO		UINT	
400973	Active Event20 Object ID	RO		UINT	
400974	Active Event20 Event Id	RO		UINT	
400975	Active Event20 ParameterId	RO		UINT	
400976	Active Event21 Level and FMI	RO		UINT	
400977	Active Event21 Object ID	RO		UINT	
400978	Active Event21 Event Id	RO		UINT	
400979	Active Event21 ParameterId	RO		UINT	
400980	Active Event22 Level and FMI	RO		UINT	
400981	Active Event22 Object ID	RO		UINT	

Register	Parameter	Write Access	Units	Data Type	Type/Notes
400982	Active Event22 Event Id	RO		UINT	
400983	Active Event22 ParameterId	RO		UINT	
400984	Active Event23 Level and FMI	RO		UINT	
400985	Active Event23 Object ID	RO		UINT	
400986	Active Event23 Event Id	RO		UINT	
400987	Active Event23 ParameterId	RO		UINT	
400988	Active Event24 Level and FMI	RO		UINT	
400989	Active Event24 Object ID	RO		UINT	
400990	Active Event24 Event Id	RO		UINT	
400991	Active Event24 ParameterId	RO		UINT	
400992	Active Event25 Level and FMI	RO		UINT	
400993	Active Event25 Object ID	RO		UINT	
400994	Active Event25 Event Id	RO		UINT	
400995	Active Event25 ParameterId	RO		UINT	
400996	Active Event26 Level and FMI	RO		UINT	
400997	Active Event26 Object ID	RO		UINT	
400998	Active Event26 Event Id	RO		UINT	
400999	Active Event26 ParameterId	RO		UINT	
401000	Active Event27 Level and FMI	RO		UINT	
401001	Active Event27 Object ID	RO		UINT	
401002	Active Event27 Event Id	RO		UINT	
401003	Active Event27 ParameterId	RO		UINT	
401004	Active Event28 Level and FMI	RO		UINT	
401005	Active Event28 Object ID	RO		UINT	
401006	Active Event28 Event Id	RO		UINT	
401007	Active Event28 ParameterId	RO		UINT	
401008	Active Event29 Level and FMI	RO		UINT	
401009	Active Event29 Object ID	RO		UINT	
401010	Active Event29 Event Id	RO		UINT	
401011	Active Event29 ParameterId	RO		UINT	
401012	Active Event30 Level and FMI	RO		UINT	
401013	Active Event30 Object ID	RO		UINT	
401014	Active Event30 Event Id	RO		UINT	
401015	Active Event30 ParameterId	RO		UINT	
401016	Active Event Select	RW		UINT	
401017	Selected Active Event Level and FMI	RO		UINT	
401018	Selected Active Event Object ID	RO		UINT	
401019	Selected Active Event Event Id	RO		UINT	
401020	Selected Active Event ParameterId	RO		UINT	
401021 thru 401034	RESERVED for factory use				
401035	Characters 1 and 2 of String for Genset Model Number	RO		STRING	
401036	Characters 3 and 4 of String for Genset Model Number				
401037	Characters 5 and 6 of String for Genset Model Number				
401038	Characters 7 and 8 of String for Genset Model Number				
401039	Characters 9 and 10 of String for Genset Model Number				
401040	Characters 11 and 12 of String for Genset Model Number				
401041	Characters 13 and 14 of String for Genset Model Number				
401042	Characters 15 and 16 of String for Genset Model Number				

Register	Parameter	Write Access	Units	Data Type	Type/Notes
401043	Characters 17 and 18 of String for Genset Model Number	RO		STRING	
401044	Characters 19 and 20 of String for Genset Model Number				
401045	Characters 21 and 22 of String for Genset Model Number				
401046	Characters 23 and 24 of String for Genset Model Number				
401047	Characters 25 and 26 of String for Genset Model Number				
401048	Characters 1 and 2 of String for Controller Serial Number	RO		STRING	
401049	Characters 3 and 4 of String for Controller Serial Number				
401050	Characters 5 and 6 of String for Controller Serial Number				
401051	Characters 7 and 8 of String for Controller Serial Number				
401052	Characters 9 and 10 of String for Controller Serial Number				
401053	Characters 11 and 12 of String for Controller Serial Number				
401054	Characters 13 and 14 of String for Controller Serial Number				
401055	Characters 15 and 16 of String for Controller Serial Number				
401056	Characters 17 and 18 of String for Controller Serial Number				
401057	Characters 19 and 20 of String for Controller Serial Number				
401058	Characters 1 and 2 of String for Genset Spec Number	RO		STRING	
401059	Characters 3 and 4 of String for Genset Spec Number				
401060	Characters 5 and 6 of String for Genset Spec Number				
401061	Characters 7 and 8 of String for Genset Spec Number				
401062	Characters 9 and 10 of String for Genset Spec Number				
401063	Characters 11 and 12 of String for Genset Spec Number				
401064	Characters 13 and 14 of String for Genset Spec Number				
401065	Characters 15 and 16 of String for Genset Spec Number				
401066	Characters 17 and 18 of String for Genset Spec Number				
401067	Characters 19 and 20 of String for Genset Spec Number				
401068	Characters 1 and 2 of String for Genset Serial Number	RO		STRING	
401069	Characters 3 and 4 of String for Genset Serial Number				
401070	Characters 5 and 6 of String for Genset Serial Number				
401071	Characters 7 and 8 of String for Genset Serial Number				
401072	Characters 9 and 10 of String for Genset Serial Number				

Register	Parameter	Write Access	Units	Data Type	Type/Notes
401073	Characters 11 and 12 of String for Genset Serial Number	RO		STRING	
401074	Characters 13 and 14 of String for Genset Serial Number				
401075	Characters 15 and 16 of String for Genset Serial Number				
401076	Characters 17 and 18 of String for Genset Serial Number				
401077	Characters 19 and 20 of String for Genset Serial Number				
401078	Characters 1 and 2 of String for Alternator Part Number	RO		STRING	
401079	Characters 3 and 4 of String for Alternator Part Number				
401080	Characters 5 and 6 of String for Alternator Part Number				
401081	Characters 7 and 8 of String for Alternator Part Number				
401082	Characters 9 and 10 of String for Alternator Part Number				
401083	Characters 11 and 12 of String for Alternator Part Number				
401084	Characters 13 and 14 of String for Alternator Part Number				
401085	Characters 15 and 16 of String for Alternator Part Number				
401086	Characters 17 and 18 of String for Alternator Part Number				
401087	Characters 19 and 20 of String for Alternator Part Number				
401088	Characters 1 and 2 of String for Engine Part Number	RO		STRING	
401089	Characters 3 and 4 of String for Engine Part Number				
401090	Characters 5 and 6 of String for Engine Part Number				
401091	Characters 7 and 8 of String for Engine Part Number				
401092	Characters 9 and 10 of String for Engine Part Number				
401093	Characters 11 and 12 of String for Engine Part Number				
401094	Characters 13 and 14 of String for Engine Part Number				
401095	Characters 15 and 16 of String for Engine Part Number				
401096	Characters 17 and 18 of String for Engine Part Number				
401097	Characters 19 and 20 of String for Engine Part Number				
401098	Characters 1 and 2 of String for Engine Model Number	RO		STRING	
401099	Characters 3 and 4 of String for Engine Model Number				
401100	Characters 5 and 6 of String for Engine Model Number				
401101	Characters 7 and 8 of String for Engine Model Number				
401102	Characters 9 and 10 of String for Engine Model Number				

Register	Parameter	Write Access	Units	Data Type	Type/Notes
401103	Characters 11 and 12 of String for Engine Model Number	RO		STRING	
401104	Characters 13 and 14 of String for Engine Model Number				
401105	Characters 15 and 16 of String for Engine Model Number				
401106	Characters 17 and 18 of String for Engine Model Number				
401107	Characters 19 and 20 of String for Engine Model Number				
401108	Characters 1 and 2 of String for Engine Serial Number	RO		STRING	
401109	Characters 3 and 4 of String for Engine Serial Number				
401110	Characters 5 and 6 of String for Engine Serial Number				
401111	Characters 7 and 8 of String for Engine Serial Number				
401112	Characters 9 and 10 of String for Engine Serial Number				
401113	Characters 11 and 12 of String for Engine Serial Number				
401114	Characters 13 and 14 of String for Engine Serial Number				
401115	Characters 15 and 16 of String for Engine Serial Number				
401116	Characters 17 and 18 of String for Engine Serial Number				
401117	Characters 19 and 20 of String for Engine Serial Number				
401118	Characters 1 and 2 of String for ECM Serial Number	RO		STRING	
401119	Characters 3 and 4 of String for ECM Serial Number				
401120	Characters 5 and 6 of String for ECM Serial Number				
401121	Characters 7 and 8 of String for ECM Serial Number				
401122	Characters 9 and 10 of String for ECM Serial Number				
401123	Characters 11 and 12 of String for ECM Serial Number				
401124	Characters 13 and 14 of String for ECM Serial Number				
401125	Characters 15 and 16 of String for ECM Serial Number				
401126	Characters 17 and 18 of String for ECM Serial Number				
401127	Characters 19 and 20 of String for ECM Serial Number				
401128 thru 409996	RESERVED for factory use, not readable				
409997	Vendor	RO		UINT	7728 for Kohler Co.
409998	Modbus Map Version	RO		UINT	1 for this map, (initial release)
409999	Controller Type	RO		UINT	49 for DEC3500

* Firmware versions before 1.4 do not support reading these reserved registers.

† Firmware versions before 1.4 do not support this parameter.

‡ Parameter is not writable in firmware versions before 1.4.

The Decision-Maker® 3500 controller reports the following abnormal values to express invalid, incorrect, or unsupported data in a given register.

Value (Hex)	Data Type	Unsigned Value (Decimal)	Signed Value (Decimal)	Description
0xFFC0	ANY	65472	-64	A Modbus register is not supported in the given application. Note: Not all unsupported registers will return the invalid register flag, some unsupported registers will return an exception response.
0x7FE0 — 0x7FFF	INT	32736 — 32767 Note: This return value is used when the value reported is a signed number. Any number larger than this will appear to be a very large negative number.	32736 — 32767	The register is supported, but the data in the register is unknown. This could indicate that the operating conditions render the data unreadable (such as sensors on an ECM engine when the ECM is not powered up), or indicate that the physical hardware to measure the quantity is either not present or replying with an out-of-range signal.
0xFFE0 — 0xFFFF	UINT	65504 — 65535	-32 — -1 Note: This return value is used when the value reported is an unsigned number. The number should not be interpreted as negative.	The register is supported, but the data in the register is unknown. This could indicate that the operating conditions render the data unreadable (such as sensors on an ECM engine when the ECM is not powered up), or indicate that the physical hardware to measure the quantity is either not present or replying with an out-of-range signal.
0xFFFFFFE0 — 0xFFFFFFFF	DINT	2147483616 — 2147483647	2147483616 — 2147483647	The register is supported, but the data in the register is unknown. This could indicate that the operating conditions render the data unreadable (such as sensors on an ECM engine when the ECM is not powered up), or indicate that the physical hardware to measure the quantity is either not present or replying with an out-of-range signal.
0xFFFFFFE0 — 0xFFFFFFFF	UDINT	4294967264 — 4294967295	4294967264 — 4294967295	The register is supported, but the data in the register is unknown. This could indicate that the operating conditions render the data unreadable (such as sensors on an ECM engine when the ECM is not powered up), or indicate that the physical hardware to measure the quantity is either not present or replying with an out-of-range signal.

6.5 Inputs and Outputs Events

Note: See Figure 6-5 for more information on Event IDs that are identified as 1 in the table below.

Event ID	Parameter ID	FMI (Failure Mode Indicator)	Event ID/Parameter at Local Display	Level	Programmed Input	Programmed Output
			Protectives			
1	1100	Low	Engine Speed	Shutdown		D
		High	Engine Speed	Shutdown		D
1	1102	Shorted High	Engine Oil Pressure *	Warning	AD	D
		Shorted High	Engine Oil Pressure *	Shutdown	AD	D
		Shorted Low	Engine Oil Pressure *	Shutdown		D
		Low	Engine Oil Pressure	Warning	AD	D
		Low	Engine Oil Pressure	Shutdown	D	D
		Open Circuit	Engine Oil Pressure *	Shutdown		D
1	1103	Low	Engine Coolant Temperature *	Warning	AD	D
		Low	Engine Coolant Temperature *	Shutdown		D
		High	Engine Coolant Temperature *	Warning	AD	D
		High	Engine Coolant Temperature *	Shutdown	AD	D
		Open Circuit	Engine Coolant Temperature *	Shutdown		D
		Shorted High (3)	Engine Coolant Temperature *	Shutdown		D
		Shorted Low (4)	Engine Coolant Temperature *	Shutdown		D
1	1115	High	Lube Oil Temperature *	Warning	AD	
		High	Lube Oil Temperature *	Shutdown	D	
1	1105	Low	Engine Coolant Level	Shutdown	D	D
1	1106	Low	Engine Fuel Level	Warning	AD	D
		Low	Engine Fuel Level	Shutdown	D	D
		High	Engine Fuel Level	Warning	D	D
		Critically High	Engine Fuel Level	Warning	D	D
1	1110	Low	Fuel Pressure	Warning	AD	D
		Low	Fuel Pressure	Shutdown	AD	D
1	1107	Low	Gen Battery Voltage	Warning		D
		High	Gen Battery Voltage	Warning		D
6		Low	Cranking Voltage	Warning		D
1	1104	Low	Engine Oil Level	Warning	AD	D
		Low	Engine Oil Level	Shutdown	D	D
1	1334	Low	Generator Voltage L1-L2	Shutdown		D
		High	Generator Voltage L1-L2	Shutdown		D
1	1336	Low	Generator Voltage L2-L3	Shutdown		D
		High	Generator Voltage L2-L3	Shutdown		D
1	1338	Low	Generator Voltage L3-L1	Shutdown		D
		High	Generator Voltage L3-L1	Shutdown		D
1	1340	Low	Avg Gen Voltage L-L	Warning		D
		High	Avg Gen Voltage L-L	Warning		D
1	1358	Low	Generator Frequency	Warning		D
		High	Generator Frequency	Warning		D
		Low	Generator Frequency	Shutdown		D
		High	Generator Frequency	Shutdown		D
1	1374	Low	Total Power (Generator Total Real Power)	Warning		D
		High	Total Power (Generator Total Real Power)	Warning		D
		High	Total Power (Generator Total Real Power)	Shutdown		D
1	1323	Low	Total Reactive Power	Warning		D
1	1356	High	Avg Current	Warning		D
1	1601	Low	Maximum Alternator Current	Shutdown		D
1	1121	High	Intake Air Temperature	Warning		D
		High	Intake Air Temperature	Shutdown		D
1	1109	High	Fuel Temperature	Warning		D
		High	Fuel Temperature	Shutdown		D
1	1114	Low	Coolant Pressure	Warning	AD	D

Event ID	Parameter ID	FMI (Failure Mode Indicator)	Event ID/Parameter at Local Display	Level	Programmed Input	Programmed Output
30			AC Sensing Lost	Warning		D
30			AC Sensing Lost	Shutdown		D
20			Alternator Protection	Shutdown		D
23			Auxiliary Input	Warning	AD	D
23			Auxiliary Input	Shutdown	D	D
5			Battery Charger Fault	Warning	AD	D
75			Ecm Communication Loss	Shutdown		D
176			Ecm Model Mismatch	Shutdown		
19			Emergency Stop	Shutdown		D
35			Fuel Tank Leak	Warning	AD	D
35			Fuel Tank Leak	Shutdown	D	D
21			Ground Fault Input	Warning	AD	D
28			Locked Rotor	Shutdown		D
37			Electrical Metering Communication Loss	Shutdown		
4			Over Crank	Shutdown		D
29			Speed Sensor Fault	Warning		D
			Other Alerts			
11			Alarm Horn Silenced	Status		
12			Engine Cool Down Active	Notice		D
14			Engine Start Aid Active	Notice		D
125			Engine Started	Status		
126			Engine Stopped	Status		
8			Emergency Power System Supplying Load	Notice		D
9			Generator Running	Notice		D
3			Not In Auto	Warning		D
248			Option Board 2A Communication Loss	Notice		
249			Option Board 2B Communication Loss	Notice		
250			Option Board 2C Communication Loss	Notice		
16			Remote Start	Status		
235			Load Priority 1 Shed	Notice		D
236			Load Priority 2 Shed	Notice		D
237			Load Priority 3 Shed	Notice		D
238			Load Priority 4 Shed	Notice		D
239			Load Priority 5 Shed	Notice		D
240			Load Priority 6 Shed	Notice		D
255			Cabinet Intrusion Alarm	Warning	D	D
253			Reserve Oil Empty	Warning	D	D
410			Stopped By Generator Management	Status		D
379			Failure To Synchronize	Warning		D
1	4740	High	Fail To Open Delay	Warning		
1	4741	High	Fail To Close Delay	Warning		
1	4716	High	Max Close Attempts	Warning		
1	3851	Erroneous Data Received	Generator Management (Invalid Generator Management Enabled)	Warning		
1	4328	High	Trip To Shutdown Delay	Shutdown		
26			Run Relay Coil Overload	Shutdown		
27			Starter Relay Coil Overload	Shutdown		
1	1702	High	System Frequency	Warning		
		Low	System Frequency	Warning		
1	1700	High	System Voltage	Warning		
		Low	System Voltage	Warning		
1	1703	Erroneous Data Received	System Phase	Warning		

Event ID	Parameter ID	FMI (Failure Mode Indicator)	Event ID/Parameter at Local Display	Level	Programmed Input	Programmed Output
ECM Diagnostics						
32			Engine Derate Active	Warning		
33			Injector Wiring Fault	Warning		
26			Run Relay Coil Overload	Warning		
31			Sensor Supply Voltage	Warning		
29			Speed Sensor Fault	Warning		
27			Starter Relay Coil Overload	Warning		
34			Water In Fuel	Warning		
Notices Excluded From Display						
25			Common Fault	Notice		D
24			Common Warning	Notice		D
15			System Ready	Notice		D
228			Remote Start Command Issued	Notice		
231			Run Button Acknowledged	Notice		
312			Contactor	Notice		D
313			Close Breaker	Notice		D
403			Remove Breaker Trip	Notice		D
404			Standalone Operation	Status	D	
405			Load Enable	Status	D	
406			Baseload Mode	Status	D	
407			System Control Mode	Status	D	
408			System Sync Mode	Status	D	
409			Enable Trims	Status	D	

* Sensor dependent

Note: A = Analog, D = Digital

Figure 6-4 Input and Output Events

6.6 Failure Mode Indicator (FMI)

CriticallyHigh	0
CriticallyLow	1
Erratic	2
ShortedHigh	3
ShortedLow	4
OpenCircuit	5
GroundedCircuit	6
MechanicalSystemNotResponding	7
AbnormalFrequency	8
AbnormalUpdateRate	9
AbnormalRateOfChange	10
RootCauseUnknown	11
DeviceOutOfOrder	12
OutOfCalibration	13
SpecialInstructions	14
SlightlyHigh	15
High	16
SlightlyLow	17
Low	18
ErroneousDataReceived	19
Unavailable	28
Available	29
OK	30
NotApplicable	31

6.7 Severity Level

Status	1
Warning	2
Fault	3
Shutdown	4
Notice	5

6.8 Object ID

DEC3500 = 0
14 Relay Board = 1

6.9 Event ID 1

Decision-Maker® 3500 Controller				
Event ID	Level	FMI	Param ID	Text to display
1	4	16	1100	Overspeed Shutdown
1	4	18	1100	Underspeed Shutdown
1	2	18	1102	Low Oil Pressure Warning
1	4	18	1102	Low Oil Pressure Shutdown
1	2	3	1102	Shorted High Oil Pressure Warning
1	4	3	1102	Shorted High Oil Pressure Shutdown
1	4	4	1102	Shorted Low Oil Pressure Shutdown
1	4	5	1102	Open Circuit Oil Pressure Shutdown
1	2	18	1103	Low Coolant Temperature Warning
1	2	16	1103	High Coolant Temp Warning
1	4	16	1103	High Coolant Temp Shutdown
1	4	5	1103	No Coolant Temp Signal Shutdown
1	4	18	1103	Low Coolant Temperature Shutdown
1	4	3	1103	Shorted High Coolant Temperature Shutdown
1	4	4	1103	Shorted Low Coolant Temperature Shutdown
1	2	18	1104	Low Oil Level Warning
1	4	18	1104	Low Oil Level Shutdown
1	4	18	1105	Low Coolant Level Shutdown
1	2	18	1106	Low Fuel Warning
1	4	18	1106	Low Fuel Shutdown
1	2	16	1106	High Fuel Warning
1	2	0	1106	Critically High Fuel Warning
1	2	18	1107	Low Battery Voltage
1	2	16	1107	High Battery Voltage
1	2	16	1109	High Fuel Temperature Warning
1	4	16	1109	High Fuel Temperature Shutdown
1	2	18	1110	Low Fuel Pressure Warning
1	4	18	1110	Low Fuel Pressure Shutdown
1	2	18	1114	Low Coolant Pressure Warning
1	2	6	1115	High Oil Temperature Warning
1	4	16	1115	High Oil Temperature Shutdown
1	2	16	1121	High Intake Air Temperature Warning
1	4	16	1121	High Intake Air Temperature Shutdown
1	2	18	1323	Low Total Reactive Power Warning
1	4	18	1334	Under Voltage Shutdown (L1-L2)
1	4	16	1334	Over Voltage Shutdown (L1-L2)
1	4	18	1336	Under Voltage Shutdown (L2-L3)
1	4	16	1336	Over Voltage Shutdown (L2-L3)
1	4	18	1338	Under Voltage Shutdown (L3-L1)
1	4	16	1338	Over Voltage Shutdown (L3-L1)
1	2	18	1340	Under Avg. Voltage Warning (L-L)
1	2	16	1340	Over Avg. Voltage Warning (L-L)
1	2	16	1356	Over Avg. Current Warning
1	4	18	1358	Under Frequency Shutdown
1	4	16	1358	Over Frequency Shutdown
1	2	18	1358	Under Frequency Warning
1	2	16	1358	Over Frequency Warning
1	2	18	1374	Low Total Power Warning
1	2	16	1374	High Total Power Warning
1	4	16	1374	High Total Power Shutdown
1	4	18	1601	Low Maximum Alternator Current

Decision-Maker® 3500 Controller				
Event ID	Level	FMI	Param ID	Text to display
1	2	16	1700	High System Voltage Warning
1	2	18	1700	Low System Voltage Warning
1	2	16	1702	High System Frequency Warning
1	2	18	1702	Low System Frequency Warning
1	2	19	1703	Erroneous Data Received System Phase Warning
1	2	19	3851	Erroneous Data Received Generator Management Warning
1	4	16	4328	High Trip To Shutdown Delay Shutdown
1	2	16	4716	High Max Close Attempts Warning
1	2	16	4740	High Fail To Open Delay Warning
1	2	16	4741	High Fail To Close Delay Warning

Figure 6-5 Event ID 1, Parameter Value Abnormal, Decision-Maker® 3500 Controller