

ENI-560

Power Control System

Asco Job # 7752P

<i>Description</i>	<i>Origin</i>	<i>Number</i>	<i>Rev</i>	<i>Pages</i>
ENI-560 Drawings	ASCO	ENI560B	3	17
ENI-560 Bill of Materials	ASCO	9567753P	1/06	8
ENI-375 Spare Parts List	ASCO	ENI375	B	3
Original Quotation	ASCO	P3190	NC	11
Crompton Protective Relay	Crompton	SPRMANUAL	5	400
SSAC Timer Relay	SSAC	TRU01E2S	7/04	1
Vicor DC-DC Converter	Vicor	NA	NA	5
Shalco Switch	Shalco	Series 26	NA	10
Asco Power Manager	Asco	381333-199	F	6
Woodward ECGP2	Woodward	26175	02/9F	182
Quick Panel Jr.	GE	GFK-2075	NA	154



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I. GENERAL QUOTATION NOTES

QUOTATION NO. P3190 PROJECT: DTE ENI 560

ASCO Bulletin 956 Synchropower® Generator Control Switchgear to automatically start, synchronize and parallel one diesel generator sets rated 560 kW at 480Y/277V, 60 Hz with a Utility source. System will be per the attached Bill of Material. Equipment is as follows:

- (1) Generator Control Cubicles

Applicable Comments:

1. Price is f.o.b., Stockton, CA, freight included to first destination (one lot shipment).
2. In addition to our standard terms and conditions contained on the reverse side, the following will apply:
 - a. Price is firm provided the order is received within 60 days and released for manufacture within 6 months from quotation. Release beyond 6 months will be at price in effect at the time of release.
 - b. Invoicing will be upon completion of ASCO work and packing for shipment. Invoices are due 30 days from date of invoice.
 - c. Start-up assistance has NOT been included in our proposal.

Upon request, a representative from the local ASCO Sales Office will visit the site when the equipment arrives to inspect for shipping damage, locate the installation and rigging instructions that are shipped with the equipment and provide any additional instructions to the site personnel that may be required.

- d. *ASCO shall provide components and wiring as dictated by the DTE design. DTE takes full responsibility for the design as well as programming and configuring of all of the devices (PLC, OIT, EGCP-2, 2301D, VFD, etc.) ASCO's warranty shall cover parts and workmanship only, not operation.*



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II. BILL OF MATERIAL

PROJECT: DTE ENI 560

ASCO Bulletin 956 Synchropower® Generator Control Switchgear to automatically start, synchronize and parallel one diesel generator sets rated 560 kW at 480Y/277V, 60 Hz with a Utility source. System will be per the attached Bill of Material. Equipment is as follows:

Generator Control Cubicles (1 required) each containing:

(Approximate Dimensions - 38"W x "D?? x 91"H) – NEMA 1

DESIGNATION	QTY	DESCRIPTION
52G, NCT	1	Generator Circuit Breaker (Square D MP), 1200 ampere frame, 1000 ampere trip, electrically operated, drawout mount, 120VAC charge and close, 24 VDC shunt trip, bell alarm. 2a & 2b auxiliary contacts and cover for manual close pushbutton with long delay, short delay, instantaneous and ground fault trip settings, GENERATOR CONNECTION ON TOP STAB, LOAD CONNECTION ON BOTTOM STAB (65KAIC)
52F1	1	Circuit Breaker (Square D FCL24030), 100AF, 30AT, 2 pole, molded case, manually operated, thermal magnetic trip, 80% rated – this will feed an external 10KVA transformer (supplied by others). The circuit breaker shall be fed from the load side of the generator breaker
52F2	1	Motor Starter Group Circuit Breaker (Square D KCL34200), 250AF, 225AT, molded case, manually operated, thermal magnetic trip, 80% rated – this will feed the manual motor starter protector and the variable frequency drive unit. The circuit breaker shall be fed from the load side of the generator breaker
MSP1, MSP2	2	Vent Fan manual motor starter protector (Square D GV2M14), 3 pole, 6 – 10 A thermal setting
M1	1	<ul style="list-style-type: none"> • VFD motor starter contactor (Square D LC1D11500BD), 3 pole, 115A contact rating, 24V DC coil, • Auxiliary contacts, 2 normally open (Square D LA1DN20) • Varistor (Square D LA4DE1U), electrical noise suppression for motor starter contactor
M2, M3	2	<ul style="list-style-type: none"> • Vent Fan motor starter contactor (Square D LP1D0910BD), 3 pole, 9A contact rating, 24V DC coil, 1 normally open auxiliary contact • Varistor (Square D LA4DE1E), electrical noise suppression for motor starter contactor • Common mounting plate for manual motor start protector and motor starter contactor (Square D GK2AF01)
X1	1	VFD reactor assembly, 55kW (75HP) (Square D RL10003)
EGCP-2	1	Engine Generator Control Panel (Woodward EGCP II) with the following features and functions:



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DESIGNATION	QTY	DESCRIPTION
		<ul style="list-style-type: none"> • 2 – 4 line LCD displays for indication of generator electrical parameters, engine generator alarms, engine generator status and configuration parameters • Engine control including starting, cranking, monitoring, cooldown and shutdown • Automatic Synchronizer with voltage, frequency, phase angle matching, and phase lock control (Device 25) • Real Load Control • Reactive Load Control • Generator Protective Features – under/over voltage, over/under frequency, reverse power, loss of excitation and speed/frequency mismatch • Engine Protective Features – high/low coolant temperature, high/low oil pressure, overspeed, over crank, start failure • Modbus RTU communications port
PM-XP	1	<p>Generator Power Manager XP (ASCO) to provide the following:</p> <ul style="list-style-type: none"> • Digital display of 3 phase V & A, KW, KVAR, KVA, KWH, KVAH, KVARH, KW Demand, HZ, pF • 8 digital inputs and 4 digital outputs • Modbus RTU communications port • Programmable Protective Relay Functions – under/over voltage, over/under frequency, reverse power, phase imbalance voltage and phase imbalance current relay.
BE3-25	1	Synch Check Relay w/ Dead Bus (BE3251A1N5)
CT	3	Generator Line Side Current transformers, 1200:5 ratio, (WICC ND1200)
SCTB-1	1	CT Shorting Block
PT	1	Generator Line Side Potential Transformer Assembly, open-delta, 4:1 ratio w/ integral fuses (ITI 2VT460FF430)
PT	1	Generator Load Side Potential Transformer Assembly, single phase, 4:1 ratio w/ integral fuses (ITI 460480FF)
CPT	1	Control Power Transformer, 500VA, 4:1 ratio w/ integral fuses (Square D CG0500480120F)
10VS	1	Overspeed protective relay, MPU input (Crompton C253-PH3U-BGBX-FS-V4)
SW1	1	Idle/Rated toggle switch, SPDT
CB1, CB2	2	Circuit Breaker, 10A, 1 pole
CB3	1	Circuit Breaker, 30A, 2 pole
DC-DC	1	DC/DC Convertor, Vicor, 100W
BBA2	1	Rectifier, 25A (IXYS VBO2016A02)
OIT	1	<ul style="list-style-type: none"> • Operator Interface Panel (GE Quick Panel Jr. QPK2D100S2P) – touchscreen, 6" STN Color LCD, 8 color, 240 x 320, 24V DC supply • Cable, OIT/PLC (HMICABC82)

III



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DESIGNATION	QTY	DESCRIPTION
E-Stop	1	Emergency Stop Pushbutton, momentary w/ 2 normally closed contacts
Reset	1	Emergency Stop Reset Lighted Pushbutton, momentary w/ normally open contacts, red lamp, 24V DC
ES	1	Engine control switch, selector switch, series 24 (Electroswitch 24904QB)
1TR	1	<ul style="list-style-type: none"> Engine Run timer, multimode (SSAC TRU3) Timer socket, 11 pin (SSAC NDS11)
CS	1	Circuit Breaker Control Switch w/ position indicating lights (Electroswitch 20PHD42)
PLC Rack	1	PLC 10 slot rack, GE Fanuc 90-30 (IC693CHS391)
PLC Slot 0	1	PLC power supply, GE Fanuc 90-30 (IC693PWR322)
PLC Slot 1	1	PLC CPU352, GE Fanuc 90-30 (IC693CPU352)
PLC Slot 2,4 & 9	3	PLC 16 channel digital input card, GE Fanuc 90-30, 24V AC/DC (IC693MDL241)
PLC Slot 3 & 5	2	PLC 16 channel digital relay output card, GE Fanuc 90-30 (IC693MDL940)
PLC Slot 6	1	PLC 4 channel analog input card, GE Fanuc 90-30 (IC693ALG221)
PLC Slot 7	1	PLC 8 channel thermocouple input card, Horner (HE693THM809)
PLC Slot 8	1	PLC 8 channel analog output card, GE Fanuc 90-30 (IC693ALG392)
PLC Slot 10	1	PLC Modbus communication card (HE693RTM500)
TC wire	1	Thermocouple extension wire, Omega (EXPP-K-20S-TWSH-UL)
ESD, 52GX, GBCR, GBTR, MBCR, MBTR, V1, V2, REN, RFW, VFD, CHP, UR, BR, K1, K2, K3, AFPS, KNDT, LOLA, HWTF, LOPF, UP, 52U	24	<ul style="list-style-type: none"> Control relay, 3PDT w/ LED, 24V DC coil (IDEC RR3BULDC24V) Relay Socket, 11 blade (IDEC SR3B05) Relay hold down (IDEC SR3B02F1)
Lugs	6	Lugs, mechanical type, #6 - 350MCM, 1 hole, 1 conductor (IlSCO TA350)
Lugs	2	Lugs, mechanical type, #2 - 600MCM, 2 hole, 4 conductor (IlSCO PB4600)
Lugs	18	Lugs, mechanical type, #2 - 600MCM, 1 hole, 1 conductor (IlSCO TA600)
TB1	44	Terminal strip w/ 44 points
TB2	22	Terminal strip w/ 22 points
TB3	10	Terminal strip w/ 10 points
TB4	12	Terminal strip w/ 12 points
TB5	6	Terminal strip w/ 6 points
TB-X1	16	Terminal strip w/ 16 points

IV



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DESIGNATION	QTY	DESCRIPTION
TB-X2	25	Terminal strip w/ 25 points
TB-Temp	25	Terminal strip w/ 25 points

Provisions (space in the cubicle only) to add a 10 slot PLC expansion rack

Provisions for mounting and wiring of electronic governor control (Woodward 2301D) and associated accessories (As required, supplied by others)

Load Bus Stab, 800A fully silver-plated copper, 3 phase, 3 wire to extend out the rear of the enclosure 6" – 9"***

Neutral Bus Stab, 800A fully silver-plated copper, to extend out the rear of the enclosure 6" – 9"***

Ground Bus Stab, 200A fully silver-plated copper, to extend out the rear of the enclosure 6" – 9"***

**Customer to provide an enclosure around the stab connections for protection and safety.