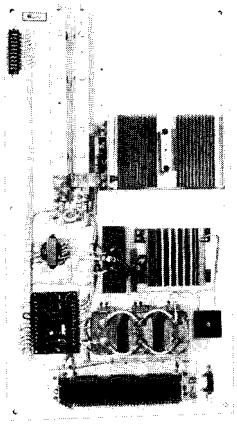
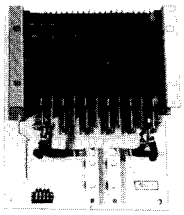
Class 200 Equipment
NFF-200 NEGATIVE FIELD FORCING MODULE
for
Shunt Static Exciter/Regulators



CONTROL CHASSIS
(Typical)



RESISTOR CHASSIS
(Typical)

DESCRIPTION:

The Basler Negative Field Forcing Module NFF 200 is for use with the SSE Shunt Static Exciter/Regulator to speed the reduction of generator voltage back to normal at load rejection.

The system is connected in series with the SSE Static Exciter output and the generator field. Using solid-state switching, the Module inserts resistance in series with the field to rapidly reduce field current and restore normal voltage.

FEATURES:

- Improves voltage recovery during load-off transients.
- Maintains voltage control during overspeed.
- Less than 40 milliseconds response time.
- Order with SSE for complete packaged excitation system or add to an existing system.
- Optional enclosure (NEMA I) available.
- Compatible with a wide range of generator sizes and voltages.
- Available for Basler SSE Models up to 100 kW.
- Patent Pending.

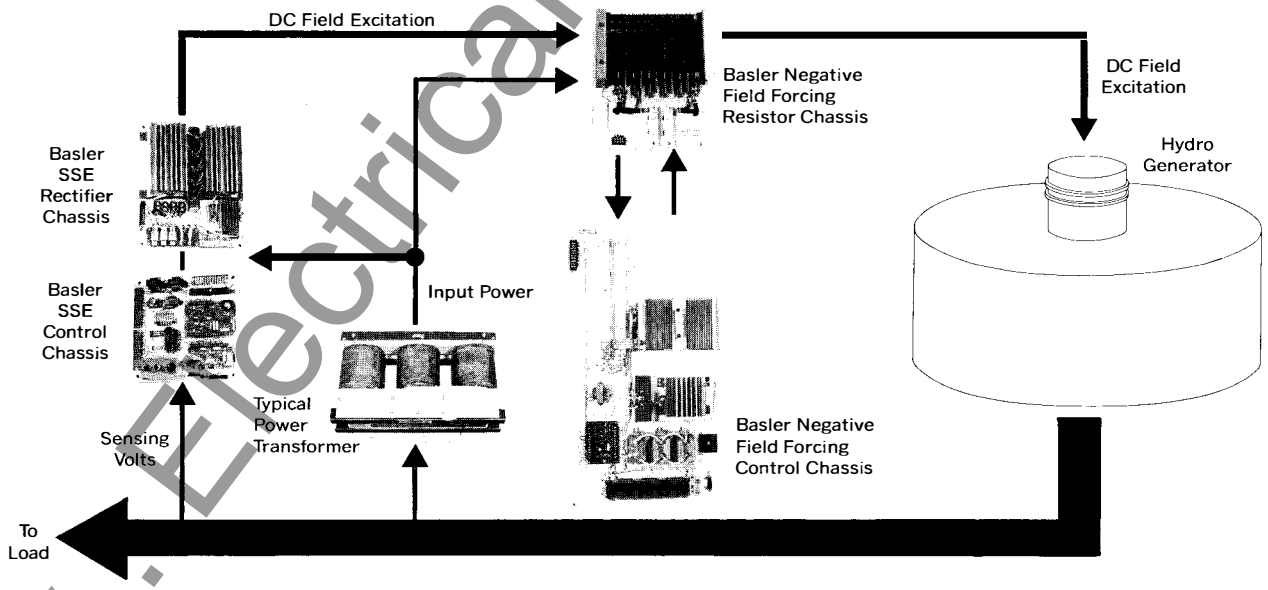


FIGURE 1 — APPLICATION DIAGRAM

Basler Electric
P. O. BOX 269 HIGHLAND, ILLINOIS 62249, U.S.A. PHONE 618-654-2341 FAX 618-654-2351

APPLICATION:

When the SSE is used alone and the load is suddenly removed, the exciter output voltage will instantaneously switch to zero. The field current, however, decays at a rate dependent upon the field inductance and resistance.

With the addition of the Negative Field Forcing Module to the SSE output, the equivalent of negative voltage is applied to the generator field at the moment of load rejection. This will cause a more rapid decay of the generator field current which forces a more rapid generator voltage recovery time. See figure 3.

SPECIFICATIONS:

OPERATING POWER: 120, 240, 480, 600Vac, 50/60 Hz.
EXCITER VOLTAGE RATING: Compatible with 63, 125, and 250 Vdc fields.
RESPONSE TIME: Less than 40 milliseconds.
NEGATIVE FIELD FORCING: The equivalent of up to 300% negative field voltage.
OPERATING TEMPERATURE: −40°C (−40°F) to +65°C (149°F).
STORAGE TEMPERATURE: −65°C (−85°F) to +85°C (185°F).
PHYSICAL DIMENSIONS: Contact factory. Size will vary according to application.
WEIGHT: Contact factory. Weight will vary according to application.
PATENT PENDING

FUNCTIONAL DESCRIPTION:

The Negative Forcing Module is used to speed system recovery time. This is accomplished by connecting the SSE output in series with a power resistor module. The power resistor is normally shorted out by a silicon controlled rectifier. During normal operation, the SSE provides the dc voltage to the field for regulating the generator output. Upon load rejection, the SSE output voltage goes instantly to zero. The Negative Field Forcing Module senses the zero volts output and immediately turns off the power SCR. The current in the field then flows through the series resistor and dissipates the field power. By adding resistance up to three times the field resistance, the equivalent of 300% negative field forcing can be obtained.

In the event of a protective relay trip, the Negative Field Forcing Module can be turned on by an outside signal. This will cause a very rapid field decay of the generator output voltage.

An LED indicator is provided on the unit which is illuminated when the power SSE is turned on.

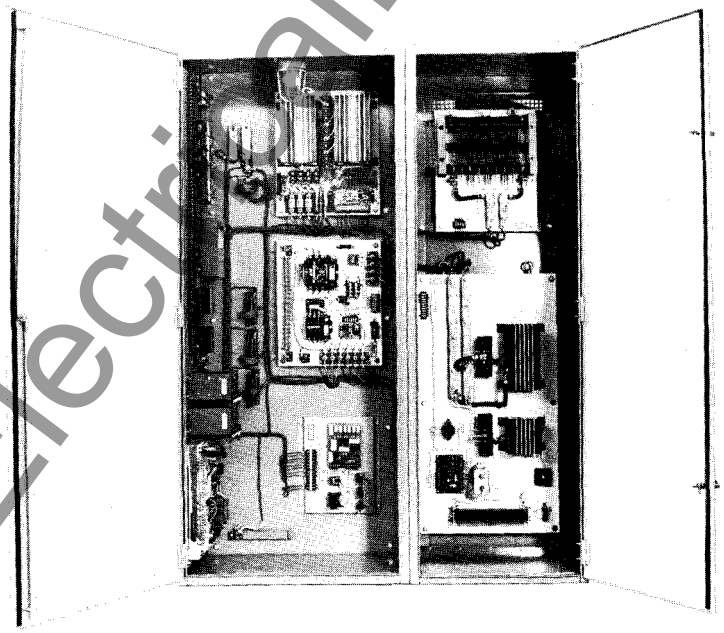


FIGURE 2 — NEGATIVE FIELD FORCING MODULE AND SSE MOUNTED IN AN ENCLOSURE

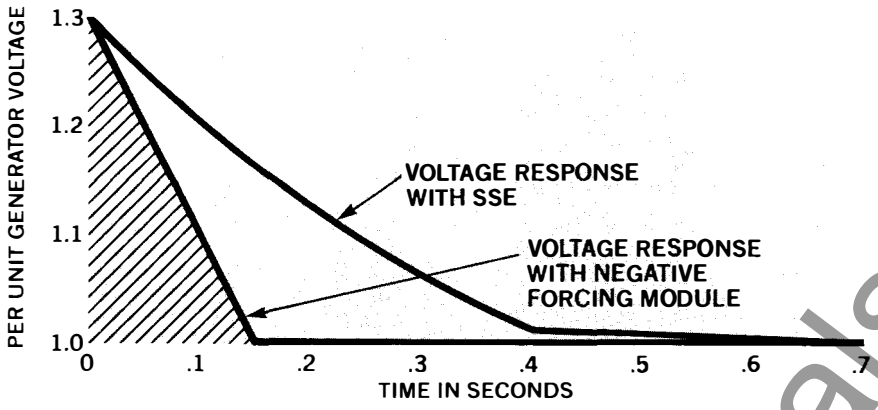


FIGURE 3 — GENERATOR FULL LOAD REJECTION AT RATED POWER FACTOR

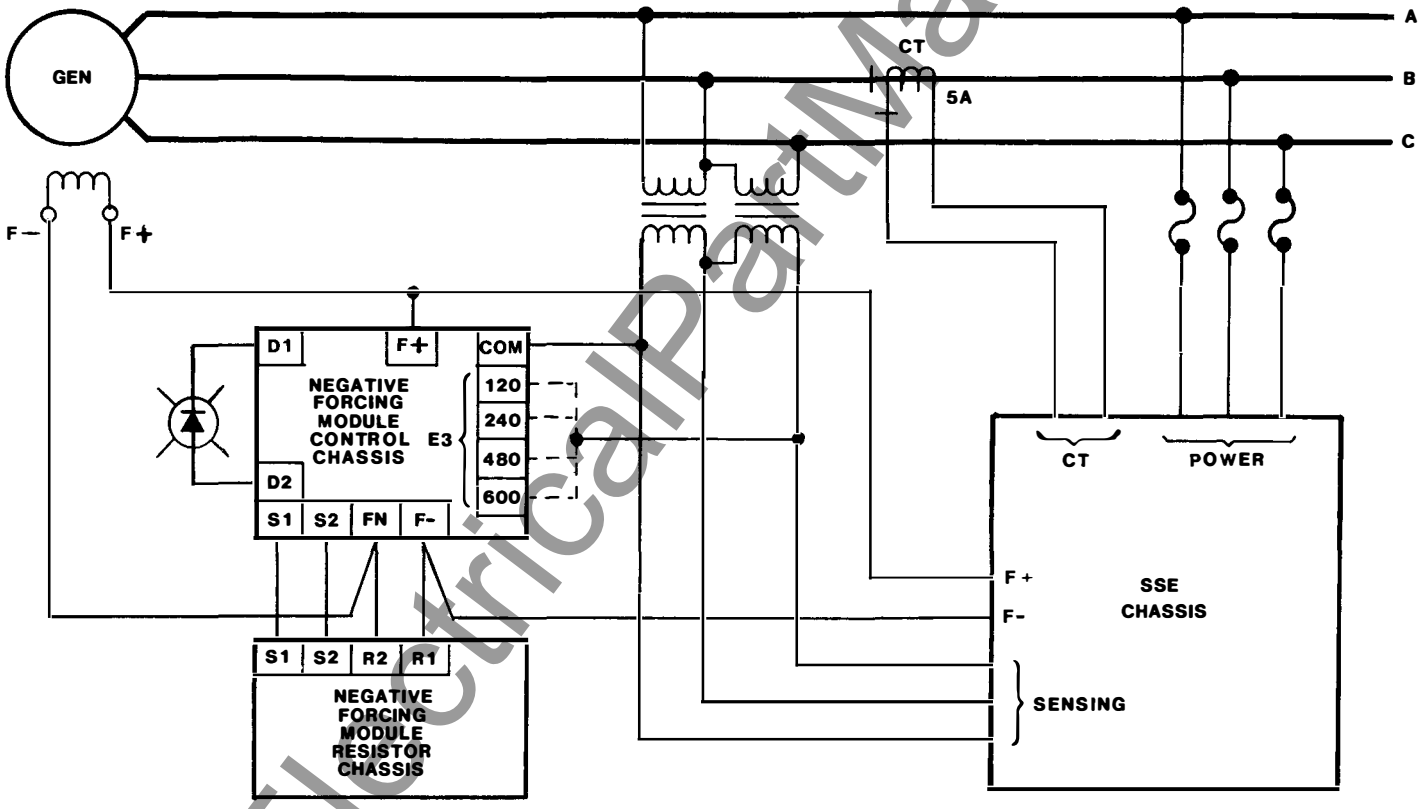


FIGURE 4 — TYPICAL INTERCONNECTION DIAGRAM

SAMPLE SPECIFICATION:

A Shunt Static Excitation System shall be supplied that has the ability to dissipate the field energy and thus assist in the generator voltage recovery time. The system must dissipate field energy up to 3 times the amount dissipated by the field itself.

Specify a Basler Electric Company model SSE Static Exciter/Regulator with NFF Negative Field Forcing Module.

HOW TO ORDER:

Determine the following information:

GENERATOR DATA

I) VOLTAGE (L-L) _____ KW _____ FREQUENCY _____

POWER FACTOR _____ PRIME MOVER _____ RPM _____

II) Generator Field Data at Rated Load and Power Factor

Generator Full Load Field Voltage = _____ Vdc

Generator Full Load Field Current = _____ Idc

Generator Field Resistance = _____ ohms

EXAMPLE

GENERATOR DATA

I) VOLTAGE (L-L) 4160 KW 2800 FREQUENCY 60

POWER FACTOR 0.8 PRIME MOVER DIESEL RPM 1800

II) Generator Field Data at Rated Load and Power Factor

Generator Full Load Field Voltage = 122 Vdc

Generator Full Load Field Current = 123 Idc

Generator Field Resistance = 0.97 ohms

TABLE 1 — NFF SELECTION CHART

If applying SSE Model:	Generator Field Power				Then Select NFF Model	Control Chassis Power Dissip. (Watts)
	Maximum Continuous		KW	Min. Field Resistance (ohms)		
	(Vdc)	(Adc)				
125-4.5kW	125	36	4.5	3.47	NFF 200	60
125-6.5kW	125	52	6.5	2.40	NFF 200	85
125-9kW	125	72	9	1.73	NFF 200	100
125-13kW	125	104	13	1.20	NFF 200	135
125-17kW	125	136	17	0.920	NFF 201	170
125-25kW	125	200	25	0.625	NFF 201	230
125-33kW	125	264	33	0.473	NFF 202	300
125-50kW	125	400	50	0.125	NFF 202	450
250-9kW	250	36	9	6.90	NFF 200	60
250-13kW	250	52	13	4.80	NFF 200	85
250-17kW	250	68	17	3.67	NFF 200	100
250-25kW	250	100	25	2.50	NFF 200	140
250-33kW	250	132	33	1.89	NFF 201	170
250-50kW	250	200	50	1.25	NFF 201	230
250-65kW	250	320	65	0.78	NFF 202	350
250-100kW	250	400	100	0.625	NFF 202	450

Consult Factory for Resistor Chassis Power Dissipation.

NOTE: All drawings and data subject to change without notice.

Basler Electric

ROUTE 143, BOX 269, HIGHLAND, ILLINOIS U.S.A. 62249
PHONE 618-654-2341 FAX 618-654-2351

P.A.E. Les Pins, 67319 Wasselonne Cedex FRANCE
PHONE (33-3-88) 87-1010 FAX (33-3-88) 87-0808

http://www.basler.com, info@basler.com