

GENERALIZED D.C./D.C. CONVERTER EXPERIMENTAL SET UP (BUCK MODE)

GDCDCCK-Series

Introduction & operating principle:

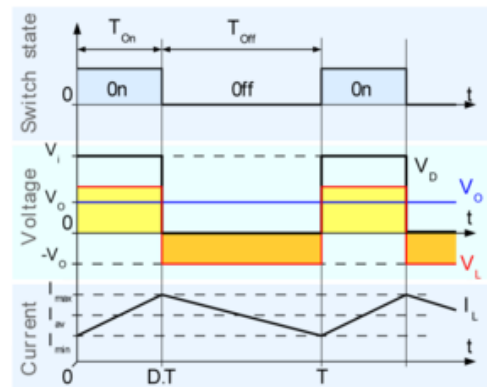
GDCDCCK series of generalized DC/DC set ups/tools are available for buck, boost, buck-boost and cook topologies offers general experimental facility to characterize all voltage/current behavior viz-viz change in duty cycle, filtering inductance, source resistance and switching frequency and impact of controller gains on steady state/transient behaviour. These are available in more than 5 regular and custom specification models virtually offering all research and development/academic solution. These useful diagnostic tool for telecom, non-conventional resources, railway ,defense, computer, academics automobile, medical, forging, aerospace, and many research & development applications, avionics, medical, heavy electrical engineering, solid state physics application, process control, non conventional energy applications etc. These are available in various power ranges from 1-100 kilo watts and frequency from 50-2000 cycles.

Operating Principle:

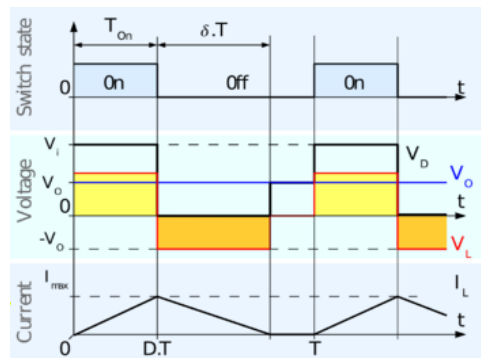
In Buck converter , during the switching transistor is switched on, inductor absorb energy as $(V_{in} - V_o)$ appears across it. During off period, V_o appears across inductor through D1, subsequently o/p voltage falls. Back emf from L1 now causes current to flow around the circuit via the load and D1, which is now forward biased. Once the inductor has returned a large part of its stored energy to the circuit and the load voltage begins to fall, the charge stored in C1 becomes the main source of current, keeping current flowing through the load until the next 'on' period begins .. $V_{out}/V_{in} = D$ and .. $I_{out}/I_{in} = 1/D$

Benefits:

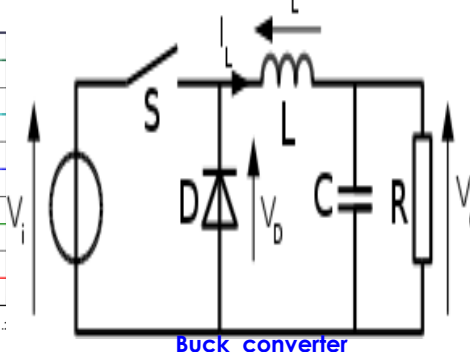
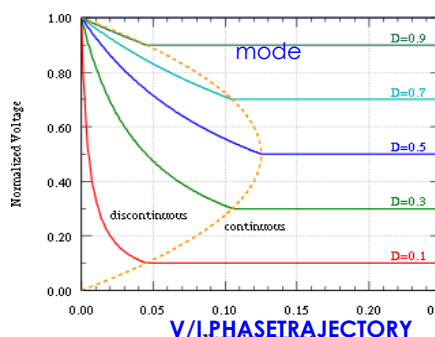
Simple installation and operational compatibility /Consistent S.C./Over/under voltage protection



BUCK converter in C.C.M.



BUCK converter in D.C.M. ode



Buck converter

Electrical/Mechanical specifications of of Buck converter set up

Power 500-2000 watts

MODEL	V.A.	V _{in} D.C.	V _{out} D.C	Frequen cy Hz	%Duty cycle range	Inductnce/ source resistance step	controllers
GDCDCB-00001	500.0	0-24/48	0-24	10/20/40	0-100%	Three	PID/SLM
GDCDCB-00002	1000.0	0-48/72	0-48	10/20/40	0-100%	Three	PID/SLM
GDCDCB-00005	2000.0	0-72/96	0-72	10/20/40	0-100%	Three	PID/SLM
GDCDCB-00010	5000.0	0-96/120	0-96	10/20/40	0-100%	Three	PID/SLM

General specification of Buck DC/DC CONVERTER :

- Operating voltage: 24/48/72/96 220 volts D.C.
- Output voltage: depending on gain,load, dutycycle but above unity
- Watts: 500/1000/2000/5000 watts
- Parametric variation: source resistance, smoothing inductance, duty cycle Frequency, load in three steps
- Controller type gain parameter: PID and sliding mode
- topologies: BUCK, BOOST, BUCK-BOOST ETC
- Display: Regulation of O/P voltage: better than 0.5 % of measurement
- Repeatability of O/P voltage: 100 percent
- Display: 3 digit LED/LCD for source resistance, smoothing inductance, duty cycle , Frequency, load , efficiency , voltage, current PID and sliding mode in three steps
- Interface: analogue;0-10 volts D.C. to state variables
- Protection: S.C./Over/under voltage/over temperature indication



GDCDCB-00002

Dimensional specs of on line AC TO AC CONVETER :

GDCDCB-00001	12x24x15 inch	10 kg	GDCDCB-00002	15x24x20 inch	16 kg
GDCDCB-00005	18x24x24 inch	26 kg	GDCDCB-00010	24x24x30 inch	47 kg

MOTORON SEMICONDUCTORS CORPORATION

33, Shri nagar colony, Shakti nagar extension, DELHI-110052. Tel: 011-23644180/23655454

e.mail: motoron@hotmail.com

GENERALIZED D.C./D.C. CONVERTER EXPERIMENTAL SET UP

(BOOST MODE)

GDCDCB-Series

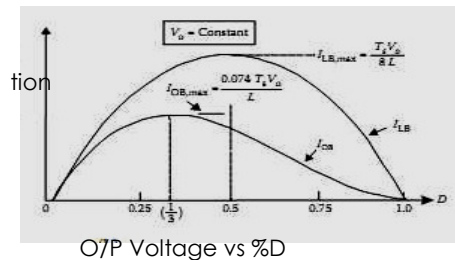
Introduction GDCDCB series of generalized DC/DC set ups/tools are available for buck, boost, buck-boost and cook topologies offers general experimental facility to characterize all voltage/current behavior viz-viz change in duty cycle, filtering inductance, source resistance and switching frequency and impact of controller gains on steady state/transient behaviour. These are available in more than 5 different model including regular and custom specification models virtually offering all research and development/academic solution. These useful diagnostic tool for telecom, non-conventional resources, railway, defense, computer, academics automobile, medical, forging, aerospace, and many research & development applications, avionics, medical, heavy electrical engineering, solid state physics application, process control, non conventional energy applications etc. These are available in various power ranges from 1-100 kilo watts and frequency from 50-2000 cycles.

Operating Principle:

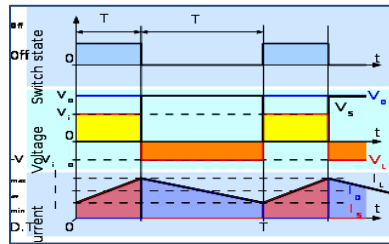
In the Boost converter, during Turn on periods, switch conduct through inductor storing huge energy. During Toff, C1 is connected to Vin through charged inductor and D1 as result inductor voltage is $V_{IN}-V_o$, so maintaining an almost steady output voltage across the load... $V_o/V_{in} = 1/1-D$ & $I_{in}/I_o = 1-D$.

Benefits:

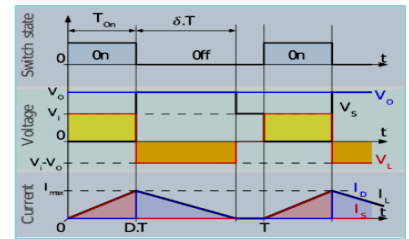
Simple installation and operational compatibility /Consistent 2. S.C./Over/under voltage protection DAS facility, all parameter display



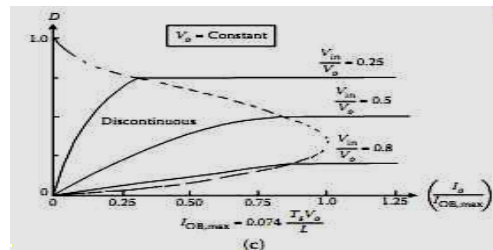
O/P Voltage vs %D



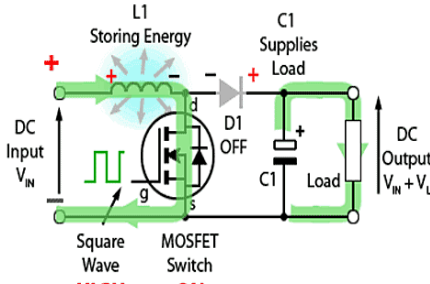
CCM mode



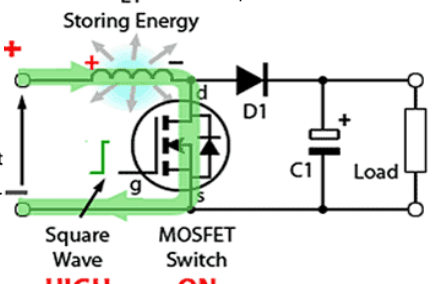
L1 DCM operation



Duty cycle Vs o/p current (boundary)



Boost converter(turn-on)



Boost Converter(turn-off)

Electrical/Mechanical specifications of of Boost converter set up

Power 500-2000 watts

MODEL	V.A.	Vin D.C.	Vout D.C.	Frequency K.Hz	%Duty cycle range	Inductnce/ source resistance step	controllers
GDCDCB-00001	500.0	24/48	0-48	10/20/40	0-100%	Three	PID/SLM
GDCDCB-00002	1000.0	48/72	0-72	10/20/40	0-100%	three	PID/SLM
GDCDCB-00005	2000.0	72/96	0-96	10/20/40	0-100%	Three	PID/SLM
GDCDCB-00010	5000.0	96/120	0-120	10/20/40	0-100%	three	PID/SLM

General specification of Boost DC/DC CONVERTER :

- Operating voltage: 24/48/72/96 220 volts D.C.
- Output voltage: depending on gain,load, dutycycle but above unity
- Watts: 500/1000/2000/5000 watts
- Parametric variation: source resistance, smoothing inductance, duty cycle frequency, load in three steps
- Controller type gain parameter: PID and sliding mode
- topologies: BUCK, BOOST, BUCK-BOOST ETC
- Display: Regulation of O/P voltage: better than 0.5 % of measurement
- Repeatability of O/P voltage: 100 percent
- Display: 3 digit LED/LCD for source resistance, smoothing inductance., duty cycle, Frequency, load, efficiency, voltage, current PID and sliding mode in three steps
- Interface: analogue;0-10 volts D.C. to state variables

Protection: S.C./Over/under voltage/over temperature indication

Dimensional specs of on line AC TO AC CONVETER :

GDCDCB-00001	12x24x15 inch	10 kg	GDCDCB-00002	15x24x20 inch	16 kg
GDCDCB-00005	18x24x24 inch	26 kg	GDCDCB-00010	24x24x30 inch	47 kg



GDCDCB-00002

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GENERALIZED D.C./D.C. CONVERTER EXPERIMENTAL SET UP

(CUK MODE)

GDCDCCK-Series

Introduction & operating principle:

GDCDCCK series of generalized DC/DC set ups/tools are available for buck, boost, buck-boost and cook topologies offers general experimental facility to characterize all voltage/current behavior viz-viz change in duty cycle, filtering inductance, source resistance and switching frequency and impact of controller gains on steady state/transient behaviour. These are available in more than 5 different model including regular and custom specification models virtually offering all research and development/academic solution. These useful diagnostic tool for telecom, non-conventional resources, railway, defense, computer, academics automobile, medical, forging, aerospace, and many research & development applications, avionics, medical, heavy electrical engineering, solid state physics application, process control, non conventional energy applications etc.

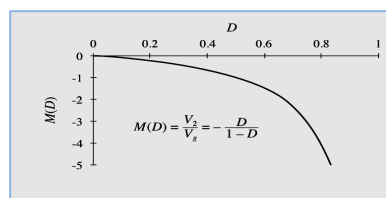
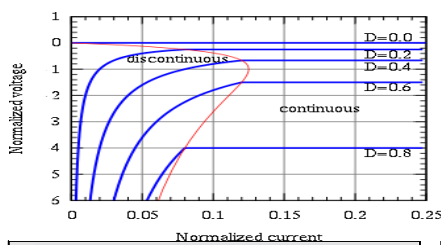
Operating Principle:

When switch is turned on, D1 is off being reversed diodes, current flows from the input source through L1 and MOSFET, storing energy in L1. When MOSFET is switch is off, D2 is forward biased and current flows from the input source, through L1 and diode, charging up C1 to a voltage somewhat higher than V_{in} and transferring some of the energy stored in L1 and L2 discharges C2 through D2. Again when MOSFET is turned on again, C1 discharges through L2 to the load, with L2 and C2 acting as a smoothing filter. If closely watched, then C1 flip-flop between input and output circuit.

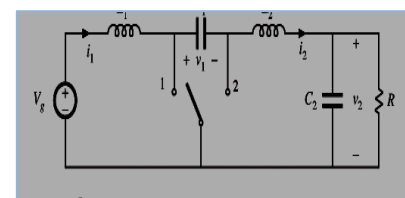
$$V_o/V_{in} = I_{L1}/I_{L2} = -D/(1-D)$$

Benefits:

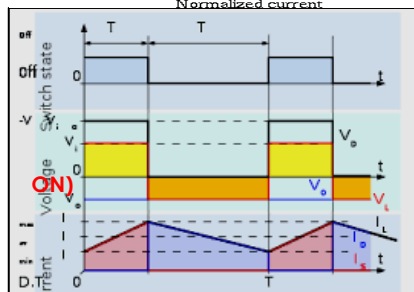
1. Simple installation and operational compatibility / Consistent 2. S.C./Over/under voltage protection
2. DAS facility, all parameter display



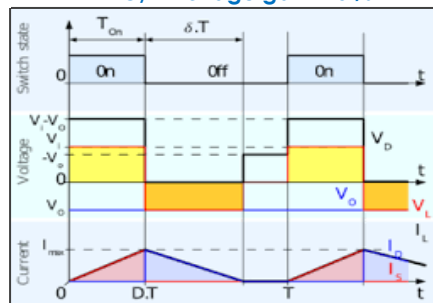
O/P Voltage gain vs %D



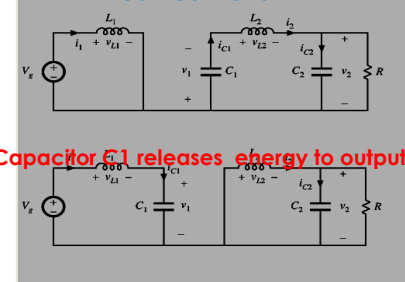
CUK Converter



CCM mode



DCM mode



Capacitor C1 releases energy to output(S-ON)

Capacitor C1 is charged from input(S-OFF)

Power 500-2000 watts

Electrical/Mechanical specifications of of CUK converter set up

MODEL	V.A.	Vin D.C.	Vout D.C.	Frequency K.Hz	%Duty cycle range	Inductance/ source resistance step	controllers
GDCDCCKT-00001	500.0	24/48	0-48	10/20/40	0-100%	Three	PID/SLM
GDCDCCKT-00002	1000.0	48/72	0-72	10/20/40	0-100%	three	PID/SLM
GDCDCCKT-00005	2000.0	72/96	0-96	10/20/40	0-100%	Three	PID/SLM
GDCDCCKT-00010	5000.0	96/120	0-120	10/20/40	0-100%	three	PID/SLM

General specification of CUK DC/DC CONVERTER :

Operating voltage: 24/48/72/96 220 volts D.C.

Output voltage: depending on gain, load, duty cycle but above unity

Watts: 500/1000/2000/5000 watts

Parametric variation: source resistance, smoothing inductance, duty cycle

Frequency, load in three steps

Controller type gain parameter: PID and sliding mode

topologies: BUCK, BOOST, BUCK-BOOST ETC

Display: Regulation of O/P voltage: better than 0.5 % of measurement

Repeatability of O/P voltage: 100 percent

Display: 3 digit LED/LCD for source resistance, smoothing inductance.,

duty cycle, Frequency, load, efficiency, voltage, current

PID and sliding mode in three steps

Interface: analogue; 0-10 volts D.C. to state variables

Protection: S.C./Over/under voltage/over temperature indication

Dimensional specs of on line AC TO AC CONVERTER :

GDCDCCKT-00001	12x24x15 inch	10 kg	GDCDCCKT-00002	15x24x20 inch	16 kg
GDCDCCKT-00005	18x24x24 inch	26 kg	GDCDCCKT-00010	24x24x30 inch	47 kg



GDCDCCK-00002

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