Functional Description

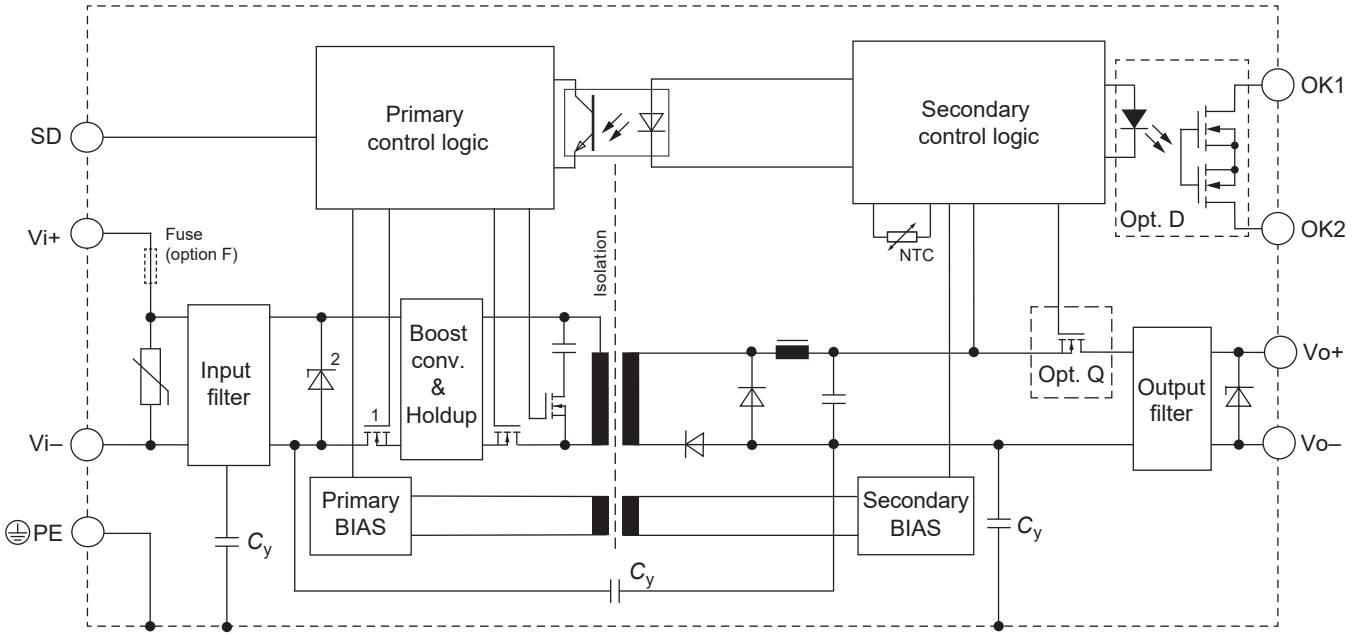
The converters are designed with two stage topology having a booster at input followed by an active clamp forward converter with a switching frequency of approximately 140 kHz. The built-in high-efficient input filter together with an inrush limiter circuit ensures very low inrush current of short duration. An antiparallel diode acts as reverse polarity protection together with the external circuit breaker or fuse.

The circuitry providing the 20 ms ride through time is located after the input filter and booster stage.

The rectification on the secondary side is provided by rectifier diodes. The output voltage control logic is located on the secondary side and influences the primary logic and PWM control circuit.

An output ORing FET is available (option Q) for use in a redundant power system architecture. If there are no external circuit breakers, it is possible to order the converter with incorporated fuse (option F). Because this fuse is not accessible, a serial FET provides reverse polarity protection (only with option F).

Option D encompasses an output voltage monitor by a solid state relay.



¹ Serial FET, only fitted with opt. F
² Bipolar suppressor diode with opt. F

Fig. 1
Block diagram

Electrical Input Data

General conditions:
- T_A = 25 °C, unless T_C is specified.

Table 2: Input data of RCM60 models

Model			12RCM60			XRCM60			Unit
Characteristics		Conditions	min	typ	max	min	typ	max	
$V_{i\,cont}$	Operating input voltage continuous	I_o = 0 – $I_{o\,nom}$ $T_{C\,min}$ – $T_{C\,max}$	8		36	16.8		137.5	V
$V_{i\,2s}$	for ≤ 100 ms	without shutdown	7.2		40	14.4		154	
$V_{i\,nom}$	Nominal input voltage			12, (24)			(24), (36), (72), (96), 110		
$V_{i\,abs}$	Input voltage limits	2 s without damage	0		50	0		160	
I_i	Maximum input current	$V_{i\,min}$, $I_{o\,nom}$			10.5			5	A
$P_{i\,0}$	No-load input power	$V_{i\,min}$ – $V_{i\,max}$, I_o = 0			6			6	W
$P_{i\,SD}$	Idle input power	$V_{i\,min}$ – $V_{i\,max}$, V_{SD} = 0 V			1.5			1.5	
C_i	Input capacitance [1]			40			40		µF
R_i	Input resistance				100			100	mΩ
$I_{inr\,p}$	Peak inrush current	V_i = $V_{i\,max}$, $P_{o\,nom}$			15			15	A
$t_{inr\,d}$	Duration of inrush current				0.5			0.5	ms
t_{on}	Start-up time	0 → $V_{i\,min}$, $P_{o\,nom}$			1000			1000	
	Start-up time after removal of shutdown	$V_{i\,min}$, $P_{o\,nom}$ V_{SD} = 0 → 5 V			500			500	

[1] Not smoothed by the inrush current limiter at start-up (for inrush current calculation)

Input Transient and Reverse Polarity Protection

A suppressor diode, varistor and a symmetrical input filter form an effective protection against input transients, which typically occur in many installations, but especially in battery-driven mobile applications.

If the input voltage has the wrong polarity, the incorporated antiparallel diode causes the external input circuit breaker or fuse to trip. With option F (incorporated fuse), an active reverse-polarity protection circuit prevents from any damage.

Input Under-/Overvoltage Lockout

If the input voltage is out of range, an internally generated inhibit signal disables the converter to avoid any damage.

Inrush Current and Stability with Long Supply Lines

The converter operates with relatively small input capacitance C_i resulting in low inrush current of short duration.

If a converter is connected to the power source through supply lines with reasonable length (<50 m), no additional measures are necessary to ensure stable operation.

Only in the case of very long supply lines exhibiting a considerable inductance L_{ext}, an additional external capacitor C_{ext} connected across the input pins improves the stability and prevents oscillations; see fig. 2.

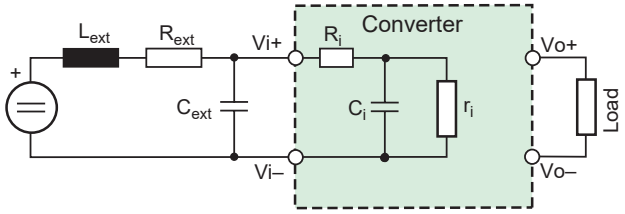


Fig. 2
Input configuration