



MLO40  
(Open-Frame)

# N2Power ML40 AC-DC Multi Output Series High Efficiency Power Supplies

## HIGHLIGHTS

- 40 W AC-DC
- High efficiency (up to 90%)
- Low standby power consumption ( $\leq 0.15$  W)
- Wide input-voltage range spans from 85 to 264 VAC
- Supports DC-DC input voltage from 120 to 370 VDC
- Convection cooled up to full power—no fan needed
- Built-in EMI filter
- Adjustable output voltage ( $\pm 10\%$ )
- Open frame dimensions: 2.00"  $\times$  3.50"  $\times$  0.94"
- 4,000 VAC input to output 2 $\times$ MOPP insulation
- Protection Class I and II
- Low leakage current ( $<75$   $\mu$ A)
- Operating altitude up to 5,000 meters
- 3-year warranty



MLU40 (U-Frame)



MLD40 (DIN Rail)



MLE40 (Enclosed)

## CONNECTOR OPTIONS

Choose from JST, Molex or Terminal Block connectors:



## HIGH EFFICIENCY IN A SMALL PACKAGE

The ML40 Multi Output Series incorporates the latest advancements in power design to provide up to 90% efficiency in an AC-DC power supply. Its unique design reduces energy consumption and generates less wasted heat, decreasing AC loads and eliminating the need for forced air cooling. The result is much more cost-effective operation.

# A POWER SUPPLY DESIGN LEADER

N2Power leads the power density race with its high efficiency ML40 AC-DC power supplies, which provide up to 90% efficiency. In fact, comparisons of efficiencies show that our supplies can reduce energy losses by up to 50%. Our advanced technology yields a very small footprint and offers the highest power density in its class. This unique design also generates less wasted heat—reducing the need for forced air cooling, decreasing AC power consumption, increasing reliability, and maximizing its economy of operation. By building our power supplies with a focus on maximizing efficiency, we can provide our valued customers with reduced energy costs, longer product lifespans, and a greater return on their investment.

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Rev082520

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# N2Power ML40 AC-DC Multi Output Series High Efficiency Power Supplies

Model Number	Part Number	Output 1			Output 2			Output 3		Regulation	Ripple & Noise (P&P)
		Voltage VDC	Current (Nominal) A	Current (MAX) A	Voltage VDC	Current (Nominal) A	Current (MAX) A	Voltage VDC	Current (MAX) A		
MLO40-05 N2C	400231-01-5	5	5	8	3.3	4	6			V1, ±0.5%, V2, ±1.5%	V1,V2 100mV p-p
MLU40-05 N2C	400233-01-1										
MLE40-05 N2C	400234-01-9										
MLD40-05 N2C	400232-01-3										
MLO40-05 N2D	400231-21-3										
MLU40-05 N2D	400233-21-9										
MLE40-05 N2D	400234-21-7										
MLD40-05 N2D	400232-21-1										
MLO40-12 N3C	400231-02-3	12	2.1	3.34	5	4	6			V1,±0.5%,V2, ±1.5%	V1, 120mV p-p, V2, 100mV p-p
MLU40-12 N3C	400233-02-9										
MLE40-12 N3C	400234-02-7										
MLD40-12 N3C	400232-02-1										
MLO40-12 N3D	400231-22-1										
MLU40-12 N3D	400233-22-7										
MLE40-12 N3D	400234-22-5										
MLD40-12 N3D	400232-22-9										
MLO40-12 N2C	400231-03-1	12	2.1	3.34	3.3	4	6			V1, ±0.5%, V2, ±1.5%	V1, 120mV p-p, V2, 100mV p-p
MLU40-12 N2C	400233-03-7										
MLE40-12 N2C	400234-03-5										
MLD40-12 N2C	400232-03-9										
MLO40-12 N2D	400231-23-9										
MLU40-12 N2D	400233-23-5										
MLE40-12 N2D	400234-23-3										
MLD40-12 N2D	400232-23-7										
MLO40-15 N3C	400231-04-9	15	1.7	2.67	5	4	6			V1, ±0.5%, V2, ±1.5%	V1, 150mV p-p, V2, 100mV p-p
MLU40-15 N3C	400233-04-5										
MLE40-15 N3C	400234-04-3										
MLD40-15 N3C	400232-04-7										
MLO40-15 N3D	400231-24-7										
MLU40-15 N3D	400233-24-3										
MLE40-15 N3D	400234-24-1										
MLD40-15 N3D	400232-24-5										
MLO40-24 N3C	400231-05-6	24	1.05	1.67	5	4	6			V1, ±0.5%, V2, ±1.5%	V1, 240mV p-p, V2, 100mV p-p
MLU40-24 N3C	400233-05-2										
MLE40-24 N3C	400234-05-0										
MLD40-24 N3C	400232-05-4										
MLO40-24 N3D	400231-25-4										
MLU40-24 N3D	400233-25-0										
MLE40-24 N3D	400234-25-8										
MLD40-24 N3D	400232-25-2										
MLO40-28 N3C	400231-06-4	28	0.72	1.43	5	4	6			V1, ±0.5%, V2, ±1.5%	V1, 280mV p-p, V2, 100mV p-p
MLU40-28 N3C	400233-06-0										
MLE40-28 N3C	400234-06-8										
MLD40-28 N3C	400232-06-2										
MLO40-28 N3D	400231-26-2										
MLU40-28 N3D	400233-26-8										
MLE40-28 N3D	400234-26-6										
MLD40-28 N3D	400232-26-0										
MLO40-05 N2MP3C	400231-07-2	5	5	8	3.3	4	6	-5	0.5	V1, ±0.5%, V2, ±1.5%, V3, ±0.7%	V1,V2 ,V3, 100mV p-p
MLU40-05 N2MP3C	400233-07-8										
MLE40-05 N2MP3C	400234-07-6										
MLD40-05 N2MP3C	400232-07-0										
MLO40-05 N2MP3D	400231-27-0										
MLU40-05 N2MP3D	400233-27-6										
MLE40-05 N2MP3D	400234-27-4										
MLD40-05 N2MP3D	400232-27-8										

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# N2Power ML40 AC-DC Multi Output Series High Efficiency Power Supplies

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Model Number	Part Number	Output 1			Output 2			Output 3		Regulation	Ripple & Noise (P&P)
		Voltage VDC	Current (Nominal) A	Current (MAX) A	Voltage VDC	Current (Nominal) A	Current (MAX) A	Voltage VDC	Current (MAX) A		
MLO40-05 N2P6C	400231-08-0	5	5	8	3.3	4	6	12	0.5	V1, ±0.5%, V2, ±1.5%, V3, ±0.7%	V1, V2, 100mV p-p, V3, 120mV p-p
MLU40-05 N2P6C	400233-08-6										
MLE40-05 N2P6C	400234-08-4										
MLD40-05 N2P6C	400232-08-8										
MLO40-05 N2P6D	400231-28-8										
MLU40-05 N2P6D	400233-28-4										
MLE40-05 N2P6D	400234-28-2	5	5	8	3.3	4	6	-12	0.5	V1, ±0.5%, V2, ±1.5%, V3, ±0.7%	V1, V2, 100mV p-p, V3, 120mV p-p
MLD40-05 N2P6D	400232-28-6										
MLO40-05 N2MP6C	400231-09-8										
MLU40-05 N2MP6C	400233-09-4										
MLE40-05 N2MP6C	400234-09-2										
MLD40-05 N2MP6C	400232-09-6										
MLO40-05 N2MP6D	400231-29-6	12	2.1	3.34	5	4	6	-5	0.5	V1, ±0.5%, V2, ±1.5%, V3, ±0.7%	V1, 120mV p-p, V2, V3, 100mV p-p
MLU40-05 N2MP6D	400233-29-2										
MLE40-05 N2MP6D	400234-29-0										
MLD40-05 N2MP6D	400232-29-4										
MLO40-12 N3MP3C	400231-10-6										
MLU40-12 N3MP3C	400233-10-2										
MLE40-12 N3MP3C	400234-10-0	12	2.1	3.34	5	4	6	-12	0.5	V1, ±0.5%, V2, ±1.5%, V3, ±0.7%	V1, V3, 120mV p-p, V2, 100mV p-p
MLD40-12 N3MP3C	400232-10-4										
MLO40-12 N3MP3D	400231-30-4										
MLU40-12 N3MP3D	400233-30-0										
MLE40-12 N3MP3D	400234-30-8										
MLD40-12 N3MP3D	400232-30-2										
MLO40-12 N3MP6C	400231-11-4	12	2.1	3.34	5	4	6	-12	0.5	V1, ±0.5%, V2, ±1.5%, V3, ±0.7%	V1, V3, 120mV p-p, V2, 100mV p-p
MLU40-12 N3MP6C	400233-11-0										
MLE40-12 N3MP6C	400234-11-8										
MLD40-12 N3MP6C	400232-11-2										
MLO40-12 N3MP6D	400231-31-2										
MLU40-12 N3MP6D	400233-31-8										
MLE40-12 N3MP6D	400234-31-6	12	2.1	3.34	3.3	4	6	5	0.5	V1, ±0.5%, V2, ±1.5%, V3, ±0.7%	V1, 120mV p-p, V2, V3, 100mV p-p
MLD40-12 N3MP6D	400232-31-0										
MLO40-12 N2P3C	400231-12-2										
MLU40-12 N2P3C	400233-12-8										
MLE40-12 N2P3C	400234-12-6										
MLD40-12 N2P3C	400232-12-0										
MLO40-12 N2P3D	400231-32-0	12	2.1	3.34	3.3	4	6	-12	0.5	V1, ±0.5%, V2, ±1.5%, V3, ±0.7%	V1, V3, 120mV p-p, V2, 100mV p-p
MLU40-12 N2P3D	400233-32-6										
MLE40-12 N2P3D	400234-32-4										
MLD40-12 N2P3D	400232-32-8										
MLO40-12 N2MP6C	400231-13-0										
MLU40-12 N2MP6C	400233-13-6										
MLE40-12 N2MP6C	400234-13-4	12	2.1	3.34	3.3	4	6	-12	0.5	V1, ±0.5%, V2, ±1.5%, V3, ±0.7%	V1, V3, 120mV p-p, V2, 100mV p-p
MLD40-12 N2MP6C	400232-13-8										
MLO40-12 N2MP6D	400231-33-8										
MLU40-12 N2MP6D	400233-33-4										
MLE40-12 N2MP6D	400234-33-2										
MLD40-12 N2MP6D	400232-33-6										

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# N2Power ML40 AC-DC Multi Output Series High Efficiency Power Supplies

...Chart continued from previous page

Model Number	Part Number	Output 1			Output 2			Output 3		Regulation	Ripple & Noise (P&P)
		Voltage VDC	Current (Nominal) A	Current (MAX) A	Voltage VDC	Current (Nominal) A	Current (MAX) A	Voltage VDC	Current (MAX) A		
MLO40-15 N3MP7C	400231-14-8	15	1.7	2.67	5	4	6	-15	0.5	V1, ±0.5%, V2, ±1.5%, V3, ±0.7%	V1, V3, 150mV p-p, V2, 100mV p-p
MLU40-15 N3MP7C	400233-14-4										
MLE40-15 N3MP7C	400234-14-2										
MLD40-15 N3MP7C	400232-14-6										
MLO40-15 N3MP7D	400231-34-6										
MLU40-15 N3MP7D	400233-34-2										
MLE40-15 N3MP7D	400234-34-0										
MLD40-15 N3MP7D	400232-34-4										
MLO40-24 N3P6C	400231-15-5	24	1.05	1.67	5	4	6	12	0.5	V1, ±0.5%, V2, ±1.5%, V3, ±0.7%	V1, 240mV p-p, V2, 100mV p-p, V3, 120mV p-p
MLU40-24 N3P6C	400233-15-1										
MLE40-24 N3P6C	400234-15-9										
MLD40-24 N3P6C	400232-15-3										
MLO40-24 N3P6D	400231-35-3										
MLU40-24 N3P6D	400233-35-9										
MLE40-24 N3P6D	400234-35-7										
MLD40-24 N3P6D	400232-35-1										
MLO40-24 N3MP6C	400231-16-3	24	1.05	1.67	5	4	6	-12	0.5	V1, ±0.5%, V2, ±1.5%, V3, ±0.7%	V1, 240mV p-p, V2, 100mV p-p, V3, 120mV p-p
MLU40-24 N3MP6C	400233-16-9										
MLE40-24 N3MP6C	400234-16-7										
MLD40-24 N3MP6C	400232-16-1										
MLO40-24 N3MP6D	400231-36-1										
MLU40-24 N3MP6D	400233-36-7										
MLE40-24 N3MP6D	400234-36-5										
MLD40-24 N3MP6D	400232-36-9										

Note: If you can't find your preferred output voltage listed on the table above, please contact a sales representative. We can easily modify standard PSUs to meet client-specific voltage requirements.

**Part Number Matrix in Excel Attachment**

MLO models are open frame, MLU models are U-frame, MLE models are enclosed, and MLD models are DIN rail.

Model No. suffix: C = Class I protection; D = Class II protection

**Compliance \* Safety:**

IEC/ EN/ ANSI/AAMI ES 60601-1  
IEC/ EN/ UL 60950-1  
IEC/EN/UL 62368-1

**EMC: EMI Emission** EN 55011, EN 55032, EN 60601-1-2 & FCC Part 18/15(class B)  
EN 61000-3-2, EN 61000-3-3

**EMC Immunity:** EN 55024, EN 60601-1-2, EN 61000-4-2,  
EN 61000-4-3, EN 61000-4-4, EN 61000-4-5,  
EN 6100-4-6, EN 61000-8, EN 61000-11

**Notes:**

- All parameters NOT specifically mentioned are measured at 230 VAC input, rated load, and 25°C ambient temperature.
- The power supply is considered a component that will be installed into a unit of equipment. The equipment itself must also be certified as EMC compliant.

**\*This product is not designed for use in critical life support systems, equipment used in hazardous environments, nuclear control systems, or other such applications that necessitate specific safety and regulatory standards other than those listed herein.**

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# N2Power ML40 AC-DC Multi Output Series High Efficiency Power Supplies

INPUT SPECIFICATIONS	
Nominal Input Voltage:	85 – 264 VAC 120 – 370 VDC
Input Frequency Range:	47 – 63 Hz
Input Current:	1.05 A @ 100 VAC 0.55 A @ 240 VAC
Safety Isolation (2xMOPP Insulation):	4000 VAC input to output 2500 VAC input to ground
Inrush Current:	60 A @ 230 VAC, 25°C
Earth Leakage (ER):	<0.5mA (NC), <0.6mA (SFC)
Touch Current(TC):	<100uA (NC), <150µA (SFC)
OUTPUT SPECIFICATIONS	
Total Output:	40 W
Output Voltages:	5 V to 28 V
Voltage Tolerance:	±1.0%
Line Regulation:	±0.2% (2)
Hold-Up Time:	Minimum 25 ms (115 VAC input, full power load)
Efficiency:	Up to 90%
Minimum Load:	0.5 W
PROTECTION	
Over Voltage Protection:	Latch mode at 125 – 140% of V <sub>OUT</sub>
Over Power Protection:	Hiccup mode at 145% of I <sub>OUT</sub>
Short Circuit Protection:	Continuous protection with auto recovery
OPERATING SPECIFICATIONS	
Operating Temperature:	-40 to +85°C
Storage Temperature:	- 40 to +85°C
Relative Humidity:	5% to 95% (non-cond.)
MTBF (full load at 25°C):	1.716 x 10 <sup>6</sup>

\* See MTBF Report for additional temperature values

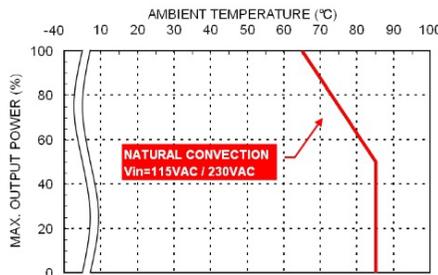
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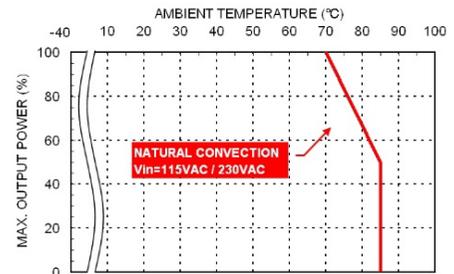
# N2Power ML40 AC-DC Multi Output Series High Efficiency Power Supplies

## CHARACTERISTIC CURVE



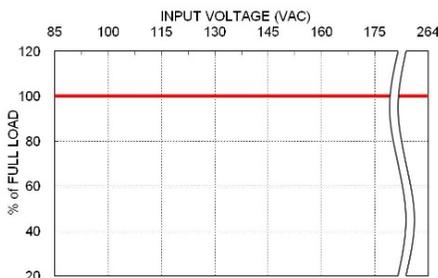
Derating Curve vs. Ambient Temperature

Dual Output Models



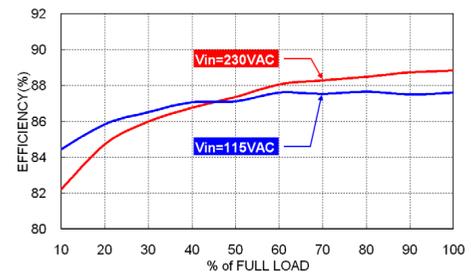
Derating Curve vs. Ambient Temperature

Triple Output Models



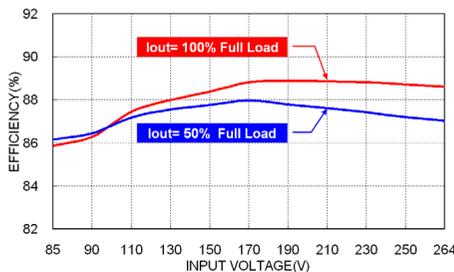
Derating Curve vs. Input Voltage

All Models



Efficiency vs. Output Load

ML#40-12 N3MP6D



Efficiency vs. Input Voltage

ML#40-12 N3MP6D

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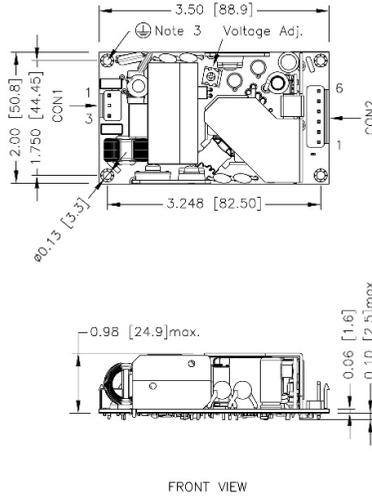
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# N2Power ML40 AC-DC

## Multi Output Series High Efficiency Power Supplies

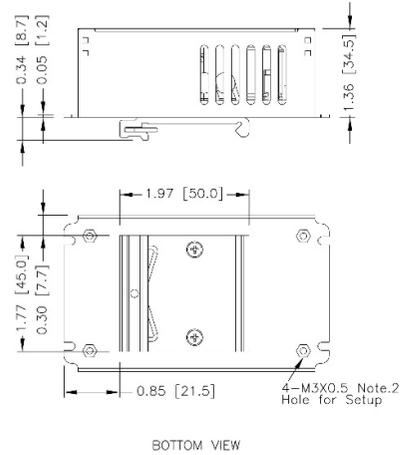
### MECHANICAL DRAWING

MLO Open type



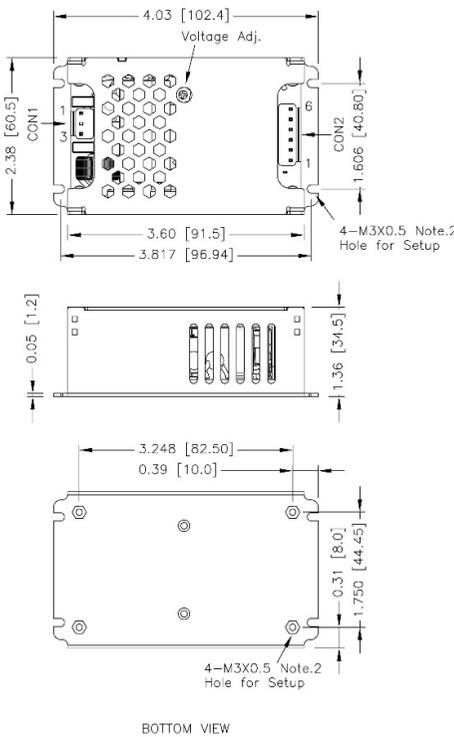
- 1.All dimensions in inch[mm]  
Tolerance:  $x.xx \pm 0.02 [x.x \pm 0.5]$   $x.xxx \pm 0.010 [x.xx \pm 0.25]$
- 2.The screw locked torque: MAX 5.0kgf-cm/0.49N-m
- 3.The screws holes can be considered as PE connection for CLASS I application.

MLD Din rail type



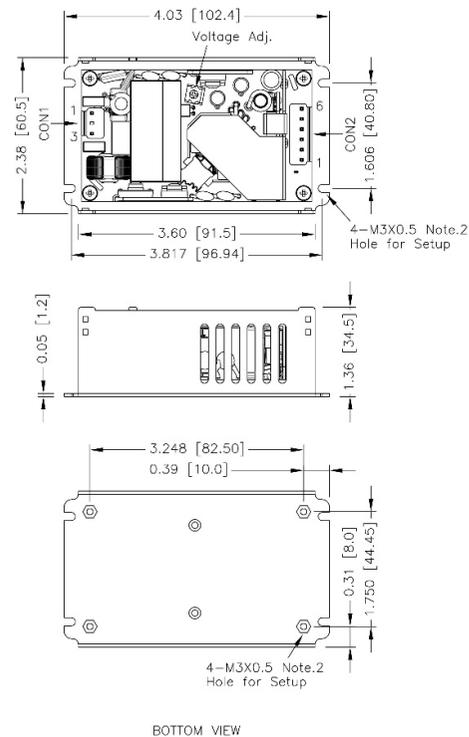
- 1.All dimensions in inch[mm]  
Tolerance:  $x.xx \pm 0.02 [x.x \pm 0.5]$   $x.xxx \pm 0.010 [x.xx \pm 0.25]$
- 2.The screw locked torque: MAX 5.0kgf-cm/0.49N-m

MLE Enclosed type



- 1.All dimensions in inch[mm]  
Tolerance:  $x.xx \pm 0.02 [x.x \pm 0.5]$   $x.xxx \pm 0.010 [x.xx \pm 0.25]$
- 2.The screw locked torque: MAX 5.0kgf-cm/0.49N-m

MLU U chassis type



- 1.All dimensions in inch[mm]  
Tolerance:  $x.xx \pm 0.02 [x.x \pm 0.5]$   $x.xxx \pm 0.010 [x.xx \pm 0.25]$
- 2.The screw locked torque: MAX 5.0kgf-cm/0.49N-m

# N2Power ML40 AC-DC Multi Output Series High Efficiency Power Supplies

## CONNECTOR CONNECTIONS

### CON1 – Input Connector

Pin Number	AC Input	DC Input
		Dual Output C, Dual Output D Triple Output C, Triple Output D
Pin 1	Line	DC+
Pin 3	Neutral	DC-

### CON2 – Output Connector

Pin 1	Vout3
Pin 2,3	Com
Pin 4,5	Vout2
Pin 6	Vout1

\*Either one of four screws holes of Chassis type can be considered as PE connection for CLASS I application.

## CONNECTOR OPTIONS

Blank:	JST Type	-M	Molex Type	-T	Terminal Block
	Mates with housing		Mates with housing		
	CON1: <b>VHR-3N</b>		CON1: <b>09-50-8031</b>		<b>Screw locked torque</b>
	CON2: <b>VHR-6N</b>		CON2: <b>09-50-8061</b>		<b>MAX 2Kgf.cm/0.2N.m</b>
	Crimp terminals		Crimp terminals		<b>Wire dimension range</b>
	CON1: <b>SVH-21T-P1.1</b>		CON1: <b>SD-2478</b>		<b>26 ~ 16AWG</b>
	CON2: <b>SVH-21T-P1.1</b>		CON2: <b>SD-2478</b>		

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