

Installation Manual

● **Type** : ICL AC inrush current limiter (**Series** : ICL-16R, ICL-16L, ICL-28R, ICL-28L)

ICL-16R	INPUT: 180-264VAC	50/60Hz	AC CURRENT: 16A (Continuous)
ICL-16L	INPUT: 180-264VAC	50/60Hz	AC CURRENT: 16A (Continuous)
ICL-28R	INPUT: 180-264VAC	50/60Hz	AC CURRENT: 28A (Continuous)
ICL-28L	INPUT: 180-264VAC	50/60Hz	AC CURRENT: 28A (Continuous)

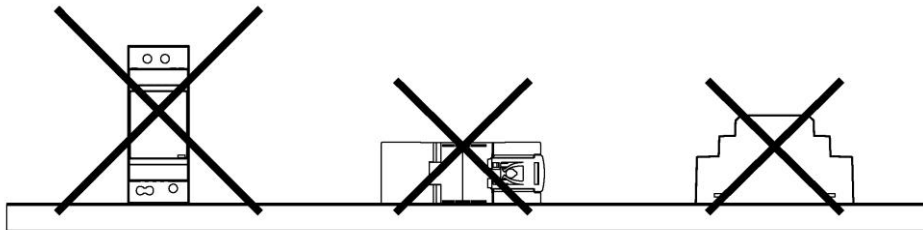
● **Introduction**

The ICL-R/L is an AC inrush current limiter that can be used to reduce the high starting current due to capacitive load or inductive causing the circuit breaker to be false triggered. Several power supplies can be installed on the same AC line after the implementation of an ICL-R/L.

● **Installation**

ICL-R :

- (1) Always allow good ventilation clearances, 5mm left and right, 40mm above and 20mm below, around the unit in use to prevent it from overheating. Also a 10-15 cm clearance must be kept when the adjacent device is a heat source.
- (2) The appropriate mounting orientation for the unit is vertical, the input terminals at the bottom and output on the top. Mounting orientations other than that, such as upside down, horizontal, or table-top mounting, is not allowed.



- (3) Use copper wire only, and recommended wires are shown as below.

AWG	18	16	14	12	10
Rated Current of Equipment (Amp)	7	10	15	25	32
Cross-section of Lead(mm ²)	0.8	1.3	2.1	2.5	4
Note : Current each wire carries should be de-rated to 80% of the current suggested above when using 4-6 wires connected to the unit.					

Make sure that all strands of each stranded wire enter the terminal connection and the screw terminals are securely fixed to prevent poor contact. If the power supply possesses multi-output terminals, please make sure each contact is connected to wires to prevent too much current stress on a single contact.

- (4) Use wires that can withstand temperatures of at least 80°C, such as UL1007.
- (5) Recommended wire strapping length is 6mm (0.236").
- (6) Recommended screwdriver is 3mm, slotted type.
- (7) The recommended torque setting for terminals is shown as below.

Model	I/P	O/P
ICL-16R	6.9 kgf-cm (6 Lb-in)	6.9 kgf-cm (6 Lb-in)
ICL-28R	5.1kgf-cm (4.43 Lb-in)	5.1kgf-cm (4.43 Lb-in)

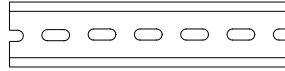
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(8) Mounting Instruction :

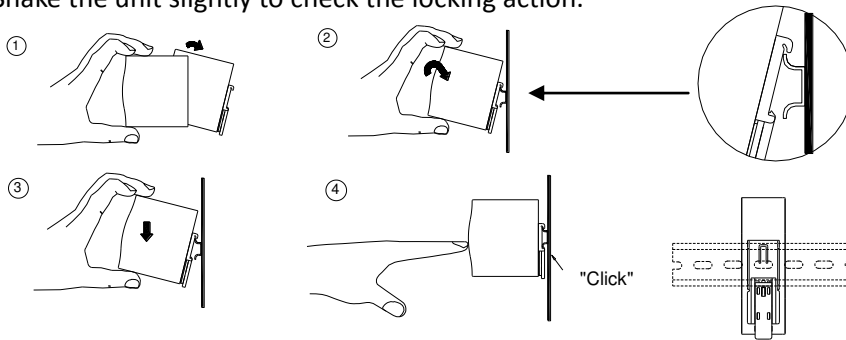
Mount as shown in figure only, with input terminals down, or else sufficient cooling will not be possible.

Admissible DIN rail : TS35/7.5 or TS35/15

For rail fastening :



- Tilt the unit slightly rearwards.
- Fit the unit over top hat rail.
- Slide it downward until it hits the stop.
- Press against the bottom for locking.
- Shake the unit slightly to check the locking action.



(9) For other information about the products, please refer to www.meanwell.com for details.

ICL-L :

- Before any installation or maintenance work, please disconnect your system from the utility. Ensure that it can't be re-connected inadvertently!
- Ventilation holes must be kept free from any obstructions. Also a 10-15 cm clearance must be kept when the adjacent device is a heat source.
- The recommended torque setting for terminals is shown as below.

Model	I/P	O/P
ICL-16L	5.7 kgf-cm (5 Lb-in)	5.7 kgf-cm (5 Lb-in)
ICL-28L	5.7 kgf-cm (5 Lb-in)	5.7 kgf-cm (5 Lb-in)

- Use copper wire only, and recommended wires are shown as below.

AWG	18	16	14	12	10
Rated Current of Equipment (Amp)	7	10	15	25	32
Cross-section of Lead(mm ²)	0.8	1.3	2.1	2.5	4
Note : Current each wire carries should be de-rated to 80% of the current suggested above when using 4-6 wires connected to the unit.					

Make sure that all strands of each stranded wire enter the terminal connection and the screw terminals are securely fixed to prevent poor contact. If the power supply possesses multi-output terminals, please make sure each contact is connected to wires to prevent too much current stress on a single contact.

- For other information about the products, please refer to www.meanwell.com for details.

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● Warning / Caution !!

“CAUTION : FOR USE IN A CONTROLLED ENVIRONMENT. REFER TO MANUAL FOR ENVIRONMENTAL CONDITION”
ATTENTION: A UTILISER DANS UN ENVIRONNEMENT CONTROLE. REFEREZ VOUS AU MANUEL POUR LES CONDITIONS D'ENVIRONNEMENT.

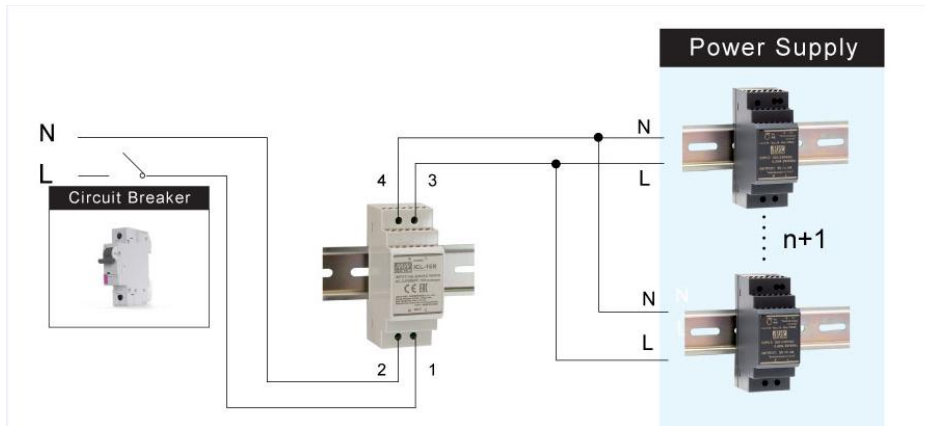
- (1) Risk of electrical shock and energy hazard. All failure should be examined by a qualified technician. Please do not remove the case of the power supply by yourself!
- (2) Risk of electric arcs and electric shock (danger to life). Connecting both the primary and the secondary sides together is not allowed.
- (3) Risk of burn hazard. Do not touch the unit in operation and shortly after disconnection!
- (4) Risk of fire and short circuit. The openings should be protected from foreign objects or dripping liquids.
- (5) Only install the unit in a pollution degree 2 environment (Note.1).
- (6) Please do not install the unit in places with high moisture or near the water.
- (7) The maximum operating temperature is 70°C for the ICL-16R/16L and 60°C for the ICL-28R/28L, please do not install the unit in places with high ambient temperature or near fire source.
- (8) Disconnect system from supply voltage:
Before commencing any installation, maintenance or modification work: Disconnect your system from supply voltage. Make sure that inadvertent connection in circuit will be impossible!

Note.1: Pollution Degree 2 applies where there is only non-conductive pollution that might temporarily become conductive due to occasional condensation. Generally refer to dry, well-ventilated locations, such as control cabinets.

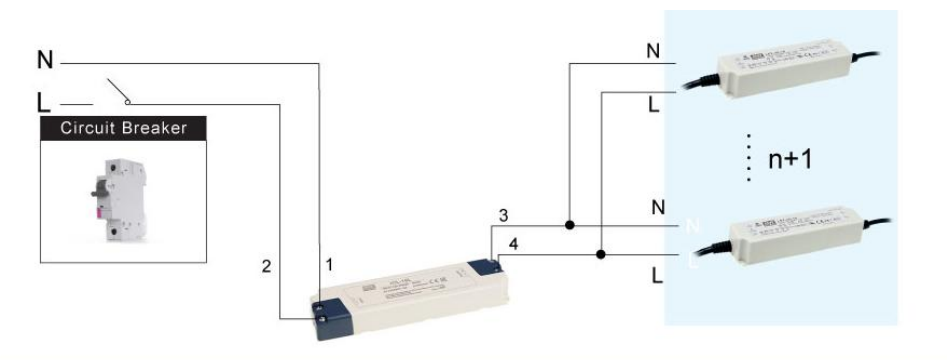
● Application Diagram

(1) ICL for Single phase application

ICL-R :

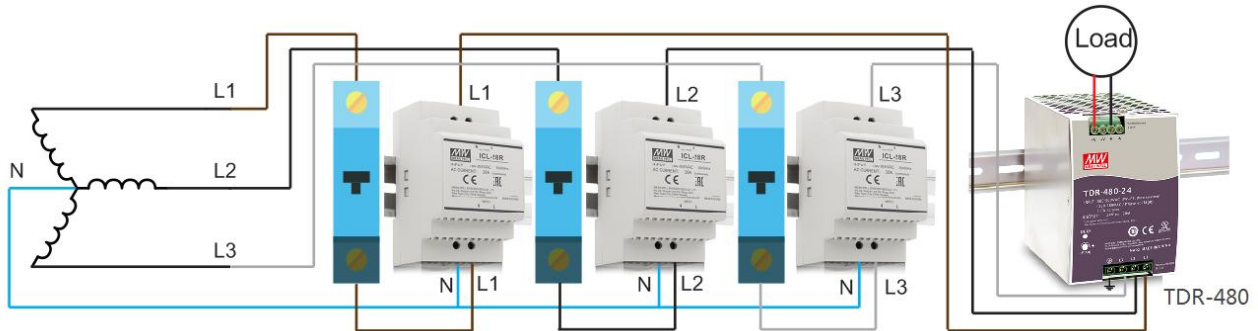


ICL-L :



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(2) ICL for Three phase application



Note: ICL-16 series is not suggested for 3 phase application.

● Application Manual

The maximum capacitive load and maximum possible rated current limit the number of power supplies that can be connected. Often, it is the rated currents that represent the decisive factor, because the inrush current limiters can handle capacitive loads as high as 2500uF/6000uF.

The input capacity of the power supplies is largely determined by primary-side storage capacitors. With MEANWELL, these capacitors are marked with the position code C5, and their capacitance can be found in the test report on the MEANWELL's website.

Regarding the q'ty of PSU can be connected behind ICL-16/28, you could quickly make an rough evaluation by following process below.

How many industrial SMPs can be connected behind ICL-16R?

Step 1

- Please check ICL-16R following spec information first.
 - AC continuous rated current
 - Capacitive load

SPECIFICATION

MODEL	ICL-16R
AC INPUT VOLTAGE	180 ~ 264VAC
AC LINE FREQUENCY	47 ~ 63Hz
AC PEAK CURRENT	23A±5%
AC CONTINUOUS RATED CURRENT	16A continuous
AC INPUT POWER	3680V (16A x 230VAC)
AC INPUT CONSUMPTION	<1W at 264VAC input
INTERNAL RELAY LIMITING TIME (TON POWER ON)	300±50ms
INTERNAL RELAY LIMITING CYCLES	10 cycles / minute
INTERNAL RELAY RELEASE TIME	500±50ms
INTERNAL RELAY LIMITING INTERVAL	>900ms
INTERNAL RELAY SWITCHING CYCLES	100K times max.
INTERNAL PROTECTION	Thermal fuse protects overload and fire
CAPACITIVE LOAD	2500µF max.

16A

2500 µF

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How many industrial SMPs can be connected behind ICL-16R?

Step 2

Check following information of connected PSU from product spec and test report on MEANWELL web-site

Example: **SDR-120-24**

SPECIFICATION				
MODEL		SDR-120-12	SDR-120-24	SDR-120-48
OUTPUT	DC VOLTAGE	12V	24V	48V
	RATED CURRENT	10A	5A	2.5A
	CURRENT RANGE	0 ~ 10A	0 ~ 5A	0 ~ 2.5A
	RATED POWER	120W	120W	120W
	PEAK CURRENT	15A	7.5A	3.75A
	PEAK POWER <small>Note.8</small>	180W (3 sec.)		
	RIPPLE & NOISE (max.) <small>Note.2</small>	100mVp-p	100mVp-p	120mVp-p
	VOLTAGE ADJ. RANGE	12 ~ 14V	24 ~ 28V	48 ~ 55V
	VOLTAGE TOLERANCE <small>Note.3</small>	±1.0%	±1.0%	±1.0%
	LINE REGULATION	±0.5%	±0.5%	±0.5%
INPUT	LOAD REGULATION	±1.0%	±1.0%	±1.0%
	SETUP, RISE TIME	1500ms, 60ms/230VAC	3000ms, 60ms/115VAC at full load	
	HOLD UP TIME (Typ.)	20ms/230VAC	20ms/115VAC at full load	
	VOLTAGE RANGE <small>Note.7</small>	88 ~ 264VAC	124 ~ 370VDC	
	FREQUENCY RANGE	47 ~ 63Hz		
	POWER FACTOR (Typ.)	0.93/230VAC	0.96/115VAC at full load	
	EFFICIENCY (Typ.)	89%	91%	90.5%
	AC CURRENT (Typ.)	1.4A/115VAC	0.7A/230VAC	
	INRUSH CURRENT (Typ.)	35A/115VAC	70A/230VAC	
	LEAKAGE CURRENT	<1mA / 240VAC		

Check AC input current spec of **SDR-120-24** and do calculation with the rated current of ICL-16

$$16A/0.7A = 22.8... \rightarrow 22 \text{ units}$$


How many industrial SMPs can be connected behind ICL-16R?

Step 3

Check following information of connected PSU from product test report on MEANWELL web-site

Example: **SDR-120-24**

SPEC
REPORT
CERTIFICATE
OTHERS



120W Single Output Industrial DIN RAIL with PFC Function

SDR-120-12 SDR-120-24 SDR-120-48

SDR-120 series

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	TEMPERATURE RISE TEST	<p>MODEL : SDR-120-24</p> <p>1. ROOM AMBIENT BURN-IN : 1 HRS</p> <p>IP 230VAC O/P FULL LOAD Ta= 27.6 °C</p> <p>2. HIGH AMBIENT BURN-IN : 3.5 HRS</p> <p>IP 230VAC O/P FULL LOAD Ta=59.7 °C</p>			

NO	Position	PIN	ROOM AMBIENT Ta= 27.6 °C	HIGH AMBIENT Ta= 59.7 °C
1	L2	TR909	41.6°C	72.5°C
2	LF1	TR750-R1	47.0°C	79.1°C
3	LF2	TR910	44.8°C	76.4°C
4	BO1	BD 4A/800V GBU40B	53.6°C	83.8°C
5		B4Q28X-600 TA800V	47.9°C	79.4°C
6	CS	100-435V 0.55C 1825 KMG	56.8°C	85.8°C
7	D3	3A/500V 1M5406	69.3°C	100.6°C
8	Q2	STP16NM60N 12A/650V	53.8°C	85.7°C

Check C5 capacitor value and do calculation with acceptable capacitive load of ICL-16R

$$2500 \mu\text{F} / 100 \mu\text{F} = 25 \rightarrow 25 \text{ units}$$

Summary :

The recommended number of units is the smaller value of results from Step 2 and 3 multiplied by a factor of 0.9.

For SDR-120-24, the recommendation is : $22 \times 0.9 = 19.8 \rightarrow 19$ units

For other model, you can use the same method to calculate it.



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