

# 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)

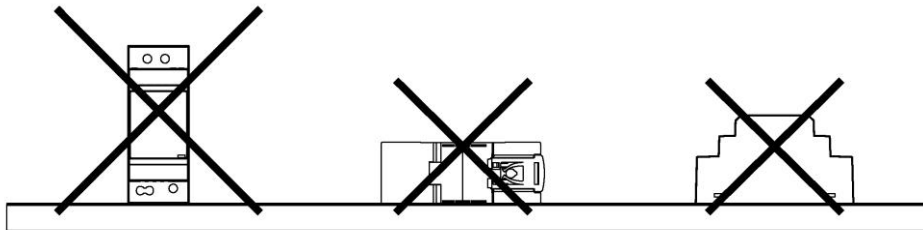
● **Introduction**

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 <sup>2</sup> )	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)

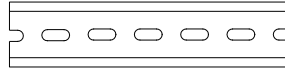
# Installation Manual

(8) Mounting Instruction :

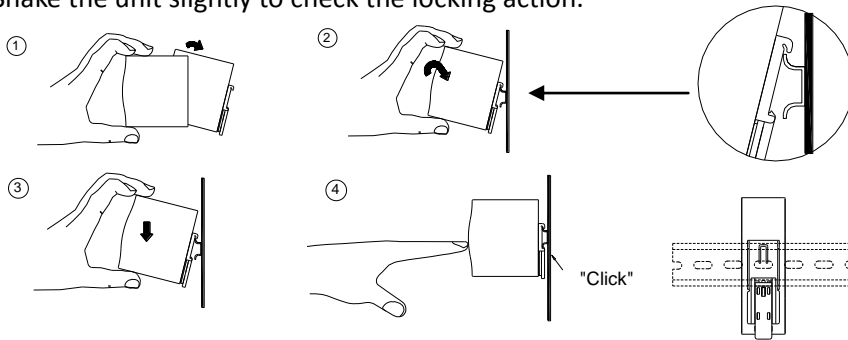
Mount as shown in figure only, with input terminals down, or else sufficient cooling will not be possible.

Admissible DIN rail : TS35/7.5 or TS35/15

For rail fastening :



- (a) Tilt the unit slightly rearwards.
- (b) Fit the unit over top hat rail.
- (c) Slide it downward until it hits the stop.
- (d) Press against the bottom for locking.
- (e) Shake the unit slightly to check the locking action.



(9) For other information about the products, please refer to [www.meanwell.com](http://www.meanwell.com) for details.

**ICL-L :**

- (1) Before any installation or maintenance work, please disconnect your system from the utility. Ensure that it can't be re-connected inadvertently!
- (2) 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.
- (3) 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)

(4) 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 <sup>2</sup> )	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.

(5) For other information about the products, please refer to [www.meanwell.com](http://www.meanwell.com) for details.

## ● 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.

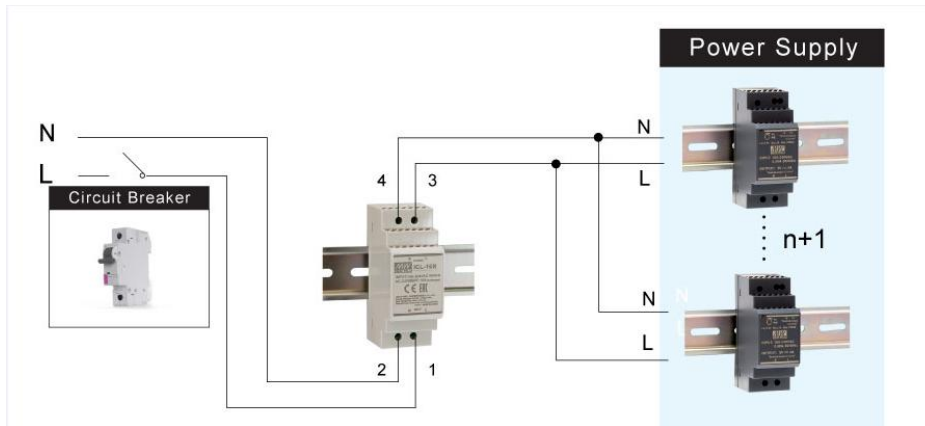
- (1) Risk of electrical shock and energy hazard. All failure should be examined by a qualified technician. Please do not remove the case of the power supply by yourself!
- (2) Risk of electric arcs and electric shock (danger to life). Connecting both the primary and the secondary sides together is not 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.

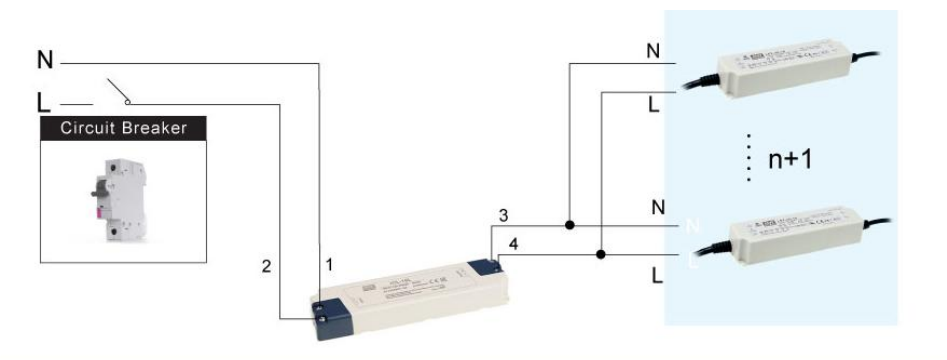
## ● Application Diagram

### (1) ICL for Single phase application

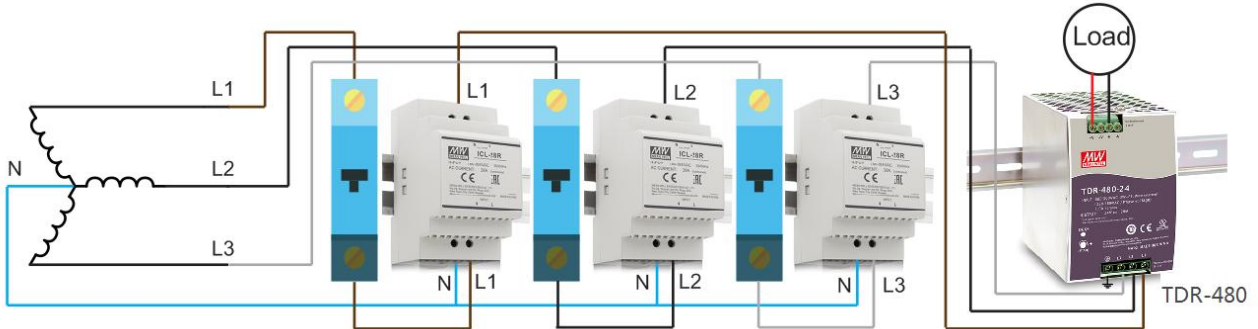
ICL-R :



ICL-L :



## (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	16A
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.	2500 µF

# Installation Manual

## 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
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.6</small>	180W (3 sec.)		
OUTPUT			
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%
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  
 $16A/0.7A = 22.8...$  → 22 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						
		SDR-120-12	SDR-120-24	SDR-120-48		
120W Single Output Industrial DIN RAIL with PFC Function <b>SDR-120 series</b>						
ENVIRONMENT TEST						
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT	
1	TEMPERATURE RISE TEST	MODEL : SDR-120-24 1. ROOM AMBIENT BUR-IN : 1 HRS IP: 230VAC O/P FULL LOAD Ta= 27.6 °C 2. HIGH AMBIENT BUR-IN : 3.5 HRS IP: 230VAC O/P FULL LOAD Ta=59.7 °C				
NO	Position	PN	ROOM AMBIENT	HIGH AMBIENT		
1	L2	TR909	Ta= 27.6 °C	Ta=59.7 °C		
2	LF1	TR790-R1	47.9°C	79.1°C		
3	LF2	TR910	44.8°C	76.4°C		
4	BD1	BD 4A-800V GBU408	53.6°C	83.8°C		
5	D1	8Vx29V-600 7A/600V	47.9°C	79.4°C		
6	C5	100u/450V 85°C 18*25 KMG	56.8°C	86.8°C	100 μF	
7	D3	3A/50V 1N5406	69.3°C	101.6°C		
8	Q2	STP14NM55N 12A/550V	53.0°C	86.2°C		

Check C5 capacitor value and do calculation with acceptable capacitive load of ICL-16R  
 $2500 \mu F / 100 \mu F = 25$  → 25 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 :  $22 * 0.9 = 19.8$  → 19 units

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



# Installation Manual

## Manufacturer :

MEAN WELL ENTERPRISES Co., LTD.  
No.28, Wuquan 3rd Rd., Wugu Dist.,  
New Taipei City 24891, Taiwan  
Tel: +886-2-2299-6100  
Web: [www.meanwell.com](http://www.meanwell.com)

## Branch Office :

### ***China***

MEAN WELL (GUANGZHOU)  
ENTERPRISES Co., LTD.  
2F, A Building, Yuean Industry Park,  
Huangcun, Dongpu Yown, Tianhe  
District, Gungzhou, China  
Post Code: 510660  
Tel: +86-20-2887-1200  
Web: [www.meanwell.com.cn](http://www.meanwell.com.cn)

### ***U.S.A.***

MEAN WELL USA, INC.  
44030 Fremont Blvd., Fremont,  
CA 94538, U.S.A.  
Tel: +1-510-683-8886  
Web: [www.meanwellusa.com](http://www.meanwellusa.com)

### ***Europe***

MEAN WELL EUROPE B.V.  
Langs de Werf 8, 1185XT  
Amstelveen, The Netherlands  
Tel: +31-20-758-6000  
Web: [www.meanwell.eu](http://www.meanwell.eu)



## Declaration of China RoHS Conformity

In order to reduce the impacts on the environment and take the more responsibility for protecting the earth, MEAN WELL is confirming and announcing the conformity to China RoHS, an Administrative Measures for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products.

### Environment Friendly Use Period Label

	<p>Observing SJT 11364-2014, Marking for the Restricted Use of Hazardous Substances in Electronic and Electrical Products</p> <p>Observing SJ/Z 11388-2009, General Guidelines of Environment-friendly Use Period of Electronic Information Products Appendix B, adopting table look-up to verify the Environment Friendly Use Period</p>
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### Names and Contents of Hazardous Substances Lists

Part Name	Hazardous Substances					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent chromium (Cr <sup>6+</sup> )	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
PCB and its components	X	O	X	O	O	O
Metal structure parts	X	O	O	O	O	O
Plastic structure parts	O	O	O	O	O	O
Accessories	O	O	O	O	O	O
Cables	X	O	O	O	O	O

O: The concentration of the hazardous substances within the homogeneous material of that product is less than the concentration limits set by GB/T 26572-2011.  
X: The concentration of the hazardous substances within the homogeneous material of that product is over the concentration limits set by GB/T 26572-2011; however, it follows the standard advised by 2011/65/EU.



MEAN WELL ENTERPRISES CO., LTD.

No.28, Wuquan 3rd Rd., Wugu Dist., New Taipei City 24891, Taiwan (R.O.C.)

Tel: + 886-2-2299-6100

Fax: + 886-2-2299-6200

E-mail: info@meanwell.com

<http://www.meanwell.com>

## Declaration of China VOC Conformity

In order to reduce the impacts on the environment and take the more responsibility for protecting the earth, MEAN WELL is confirming and announcing the conformity to China's Standardization Administration Releases VOC Standards

Standard No.	Name of the Standard
GB 30981-2020	Limit of harmful substances of industrial protective coatings
GB 33372-2020	Limits for volatile organic compounds content in adhesive
GB 38507-2020	Limits for volatile organic compounds (VOCs) In printing ink
GB 38508-2020	Limits for volatile organic compounds content in cleaning agents

ISO-9001 CERTIFIED

*Your Reliable Power Partner*





## Declaration of Five PBT TSCA Conformity

In order to reduce the impacts on the environment and take the more responsibility for protecting the earth, MEAN WELL hereby confirms that MEAN WELL product series comply with Use and Risk Management for Five PBT Chemicals under TSCA section 6(h)

CAS No.	Substance Name
1163-19-5	Decabromodiphenyl ether (DecaBDE)
68937-41-7	Phenol, isopropylated, phosphate (3:1) PIP (3:1)
732-26-3	2,4,6-Tris (tert-butyl) phenol (2,4,6-TTBP)
133-49-3	Pentachlorothiophenol (PCTP)
87-68-3	Hexachlorobutadiene (HCBD)