

# ES-10

## Field Installation Manual

### INDEX

Important Instructions.....	2
Product Specifications.....	3
Unpacking & Mounting .....	4
Connection Type 1 .....	5
Connection Diagram .....	6
Connection Type 2 .....	7
Connection Type 3 .....	8
Electrical Data Sheet .....	9
Recommended Part List.....	10

# ES-10

## IMPORTANT INSTRUCTIONS

**ATTENTION:** After completing the installation and testing, it is essential that this booklet is drawn to the attention of the person responsible for its future operation and maintenance and is available for ready reference all the time.

**FAILURE TO READ AND FOLLOW ALL INSTRUCTIONS CAREFULLY BEFORE INSTALLATION & OPERATION WILL VOID WARRANTY OF ES-10 AND COULD CAUSE SERIOUS PERSONAL INJURY, FIRE HAZARD & ELECTRIC SHOCK MAY LEAD TO DEATH.**

**CAUTION:**

To prevent electric shock, disconnect electric power to system at main fuse or circuit breaker box until installation or rework is complete.

**PRECAUTION:**

Do not use on circuits exceeding specified voltage.

Do not short main terminals to test.

Electrical Installation and all components of the installation must be UL listed / UL approved and as per NEC code.



## WARNING

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# PRODUCT SPECIFICATIONS



**Model:** ..... ES-10, ES-10 (E)  
**Rated Voltage**..... 208V AC  
**Phases**..... Three Phase 120/208V AC  
**Rated Frequency**..... 60Hz  
**Maximum Current**..... 21.6 Amp per phase  
**Maximum kVar**..... 7.8  
**Maximum Ambient Temperature** ..... 40°C  
**Enclosure**..... Type 1

Connection Terminal	Connection Type	Size	Wire Type & Temperature	Torque N-m (Lb-in)
T1	Power Circuit	10 AWG, Str.	105°C	1.2(14)
T2, T3 & T4	CT Circuit *	22-18 AWG, Str./Sol.	105°C	0.5(7)
Earthing Terminals	Bonding Circuit	10 AWG, Str./Sol.	105°C	8.5(75)

# UNPACKING

1. Un Pack the ES-10 from box using Plastic Strip Cutter.
2. Collect the Accessories as per the Packing Slip.
3. Remove any cardboard or thermocol packing inside the ES-10 given for support during transportation.
4. Do not use ES-10 in case of any Breakage or loose connections or Oil Spill inside.

# MOUNTING

**CAUTION:** - Indoor Use Only, Type-1 Enclosure.

1. Choose the dry and Clean Wall to Install the ES-10 taking care conduit connections from Bottom side  
Enclosure Size is 400 x 300 x 120 mm and weight 10kg (22 Pounds).
2. Premark the Mounting holes on wall or structure.
3. Make a Drill for the wall plugs.
4. Fix the Enclosure on wall with fasteners.

# ES-10

## Field Installation Manual

### Connection Type # 1

#### Use this instruction

*If 30 Amp circuit breaker is available in customer Main Breaker Panel.*

**ES-10 is designed for use with Main Breaker Panel Three Phase 120/208V AC WYE Connection, up to 200 Ampere.**

**ES-10 unit should be mounted with four appropriate sized fasteners before connect to Main Breaker Panel.**

### **1.1 Power Connections**

- 1.11 Remove the Panel cover of ES-10 exposing internal connections.
- 1.12 Locate Earth Terminal in ES-10, connect the earth wire to ES-10 Earth Terminal. Connect the other side of earth wire to main breaker panel ground rod. Ensure all mechanical connections are secure and making full contact.
- 1.13 Locate existing 3 Pole 30 Amp Circuit Breaker in the Main Breaker Panel.
  - (a) Connect the wire L1 to Phase 1 of 30 Amp circuit breaker.
  - (b) Connect the wire L2 to Phase 2 of 30 Amp circuit breaker
  - (c) Connect the wire L1 to Phase 3 of 30 Amp circuit breaker.
  - (d) Connect the Neutral from Neutral Bar.
- 1.14 Qualified Representative must inspect size of cable 10 AWG.
- 1.15 Connect power cables to T1 Terminal Block of ES-10.

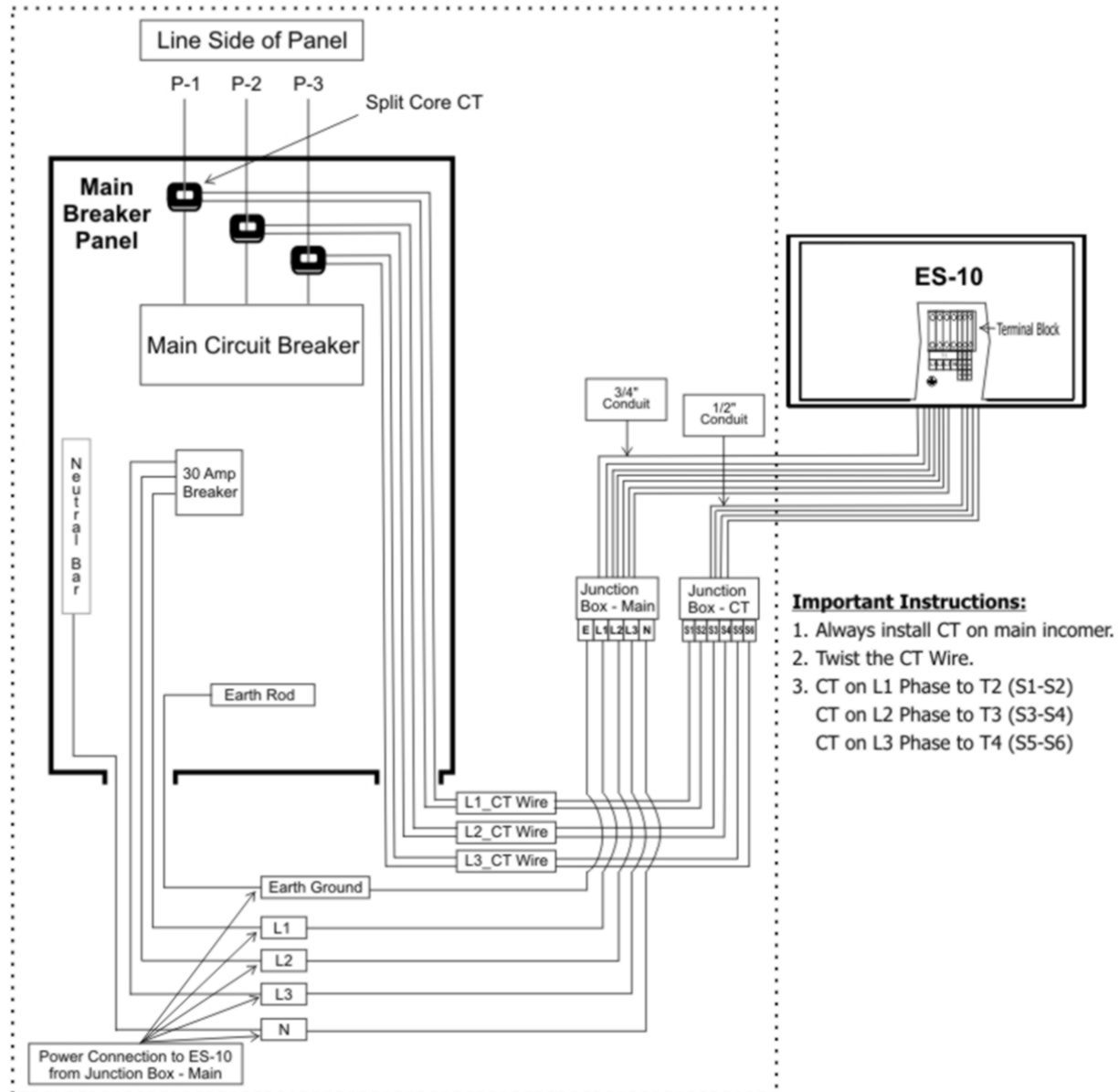
### **1.2 Current Sensor Connections**

- 1.21 Open one side of all 3 Split CT (Current Sensor). Clip the CT one by one on the wire L1, L2 & L3 before main Circuit Breaker Panel as shown in figure-1 page 6.
- 1.22 Locate Terminal Block T2 (S1-S2), T3 (S3-S4) & T4 (S5-S6) in ES-10.
- 1.23 Qualified Representative line side of Main Panel should connect the wires from:-
  - (a) External CT on L1 to T2 (S1-S2).
  - (b) External CT on L1 to T3 (S3-S4).
  - (c) External CT on L1 to T4 (S5-S6), preferably twisted.
- 1.24 Firmly secure current sensor to line side (L1, L2 & L3) of main circuit breaker.

# ES-10

## Field Installation Manual

### Connection Diagram



- Important Instructions:**
1. Always install CT on main incomm.
  2. Twist the CT Wire.
  3. CT on L1 Phase to T2 (S1-S2)  
 CT on L2 Phase to T3 (S3-S4)  
 CT on L3 Phase to T4 (S5-S6)

- Note:**
- All Components used for installation must be UL listed or UL recognized.
  - Earth Terminal in ES-10 must be connected to Panel earth rod.
  - All external connections and additional work must be performed by qualified representative in accordance with NEC.
  - Failure to comply will void warranty.

Figure-1

# ES-10

## Field Installation Manual

### Connection Type#2

#### **Use these instructions**

*If 30 Amp circuit breaker is unavailable, existing blanks are available.*

**ES-10 unit is designed for use with Customer Main Breaker Panel Three Phase 120/208V AC WYE Connection, up to 200 Ampere.**

ES-10 units should be mounted with four appropriate sized fasteners before connect to Main Breaker Panel.

1. Remove Main Panel covers exposing internal wiring and breakers.
2. Remove existing 3 Pole breaker blanks and install new 3 Pole 20 Amp circuit Breakers.
3. For rest of connection follow the Connection type#1 on page 5.

# ES-10

## Field Installation Manual

### Connection Type#3

#### **Use this instruction**

*If 30 Amp circuit breaker is unavailable and require a new disconnect switch or other approved device.*

**ES-10 unit is designed for use with Customer Main Breaker Panel Three Phase 120/208V AC WYE Connection, up to 200 Ampere.**

**Representative must purchase 30 Amp Blade-Fused Disconnect Switch or 30 Amp Circuit Breaker for connection of ES-10 to Customer Main Breaker Panel.**

1. Install new 30 Amp Blade-Fused disconnect or External Circuit Breaker switch to wall or existing backboard. Qualified Representative should note if codes allow for direct connection to bus bars in main breaker panel or requires installation of an additional sub panel.
2. Wire in rigid conduit between customer main breaker panel & external disconnect switch. Connect to ES-10 using 3/4" conduit.
3. Locate earth ground connection in ES-10 and connect to grounding bar or to earth ground rod in main breaker panel.
4. For rest of connection follow the Connection type#1 on page 5.



# ES-10

## Field Installation Manual

### Electrical Data Sheet

Model	ES-10, ES-10 (E)
Phase Configuration	Three Phase 120/208V AC
Maximum Line Voltage	208V AC
Maximum Power	7.8 kVar
Monitoring	Power Factor, Voltage, Current , Power, ON status
Accuracy	0.16 kVar each phase
Frequency	60Hz
Protection	Capacitor Inbuilt Protection P2, External Circuit Breaker/Fuse.
Equipment Protection	Internal design has adequate clearance and creepage distance against line transients. MOVs not required.
Circuit breaker Required	30 Amp 3 pole
Low Losses	0.5 Watt each step
Human Protection	All High voltage shielded from contact.
Operating temperature range	40°C Ambient
Dimensions(L X H X D)	16" X 12" X 5" ( 400 x 300 x 120 mm) Metal Enclosure Type 1
Operating Life	Switching tested up to 25,000 times, 6,000 as per UL
Wire Gauge & Rating	10 AWG Str for Power, 22 AWG Str for CT
Unit Weight	10 kg (22 Pounds)

# ES-10

## Field Installation Manual

### Recommended Parts List

Item	Make	Part No.	Qty.
Main Wire 10 AWG Str. 600v	Any *	UL1015	As required
CT Wire 22 AWG Str. 600v	Any *	UL1015	As required
Bonding Wire 10 AWG Str. 600v	Any *	UL 1015	As required
CT (Current Sensor)	Megnelab	SCT-0750-050	3
Dowel Plug Size M8	Any	---	4
Screw 50 mm Size M8	Any	---	4
1/2" Conduit Connector	Any *	---	4
1/2" Tube/Conduit	Any *	---	As required
3/4" Conduit Connector	Any *	---	4
3/4" Tube/Conduit	Any *	---	As required

**\*All the Parts used in installation must be UL recognized or UL listed.**

#### NOTE

Installation of material and workmanship at the customer's Main Breaker Panel shall be the responsibility of the qualified Electrician in accordance with NEC. Any and all connections exterior to the ES-10 unit shall be the responsibility of the qualified Electrician.