

# ES-65

## 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-65

## 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-65 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**

Celec manufacture components & parts that can be used in a wide variety of industrial & commercial applications. The selection and application of Celec products remains the responsibility of the equipment designer or end user. Celec accepts no responsibility for how its products may be incorporated into final design. Under no circumstances should any Celec product be incorporated into any product or design as the exclusive or sole safety control, all controls should be designed to dynamically fault defect and fail safety under all circumstances. Any warning provided by Celec must be passed through to the end user. Celec offers a warranty only as to the quality of its product to confirm to the catalog specifications. No other warranty is offered. Celec assumes no liability for any personal injury, property damage, losses or claims arising out of the misapplication and Non performance of its products.

# ES-65

## PRODUCT SPECIFICATIONS



**Model:** ..... ES-65  
**Rated Voltage**..... 277/480V AC  
**Phases**..... Three phase Wye/Delta  
**Rated Frequency**..... 60Hz  
**Maximum Current**..... 79 Amp per phase  
**Rated kVar** ..... 65  
**Maximum Ambient Temperature** ..... 40°C  
**Enclosure**..... Type 1

| Connection Terminal | Connection Type | Size                | Wire Type & Temperature | Torque N-m (Lb-in) |
|---------------------|-----------------|---------------------|-------------------------|--------------------|
| T1                  | Power Circuit   | 1 AWG               | CU, 60/75°C             | 2.5(22.12)         |
| T2                  | CT Circuit *    | 10 AWG, Str./Sol. * | CU, 60/75°C             | 0.5(7)             |
| Earthing Terminals  | Bonding Circuit | 8 AWG, Str./Sol.    | CU, 60/75°C             | 8.5(75)            |

\* Specified as per UL. Nominal Current in CT Circuit is less than 100 mA. May use 18-22 AWG Str./Sol.

# ES-65

## UNPACKING

1. Un Pack the ES-65 from box using Plastic Strip Cutter & 17 No. Spanner.
2. Collect the Accessories as per the Packing Slip.
3. Remove any cardboard or thermocol packing inside the ES-65 given for support during transportation.
4. Install the Load Break Switch handle on the door.
5. Do not use ES-65 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-65 taking care conduit connections from top side  
Enclosure Size is 600 x 760 x 210 mm and weight 52kg (115 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-65

## Field Installation Manual

### Connection Type # 1

#### Use this instruction

*If 125 Amp circuit breaker is available in customer Main Breaker Panel.*

**ES-65 is designed for use with Main Breaker Panel Three Phase 277/480V AC WYE/Delta Connection, up to 1000 Ampere.**

**ES-65 unit should be mounted with four appropriate sized fasteners before connect to Main Breaker Panel.**

#### **1.1 Power Connections**

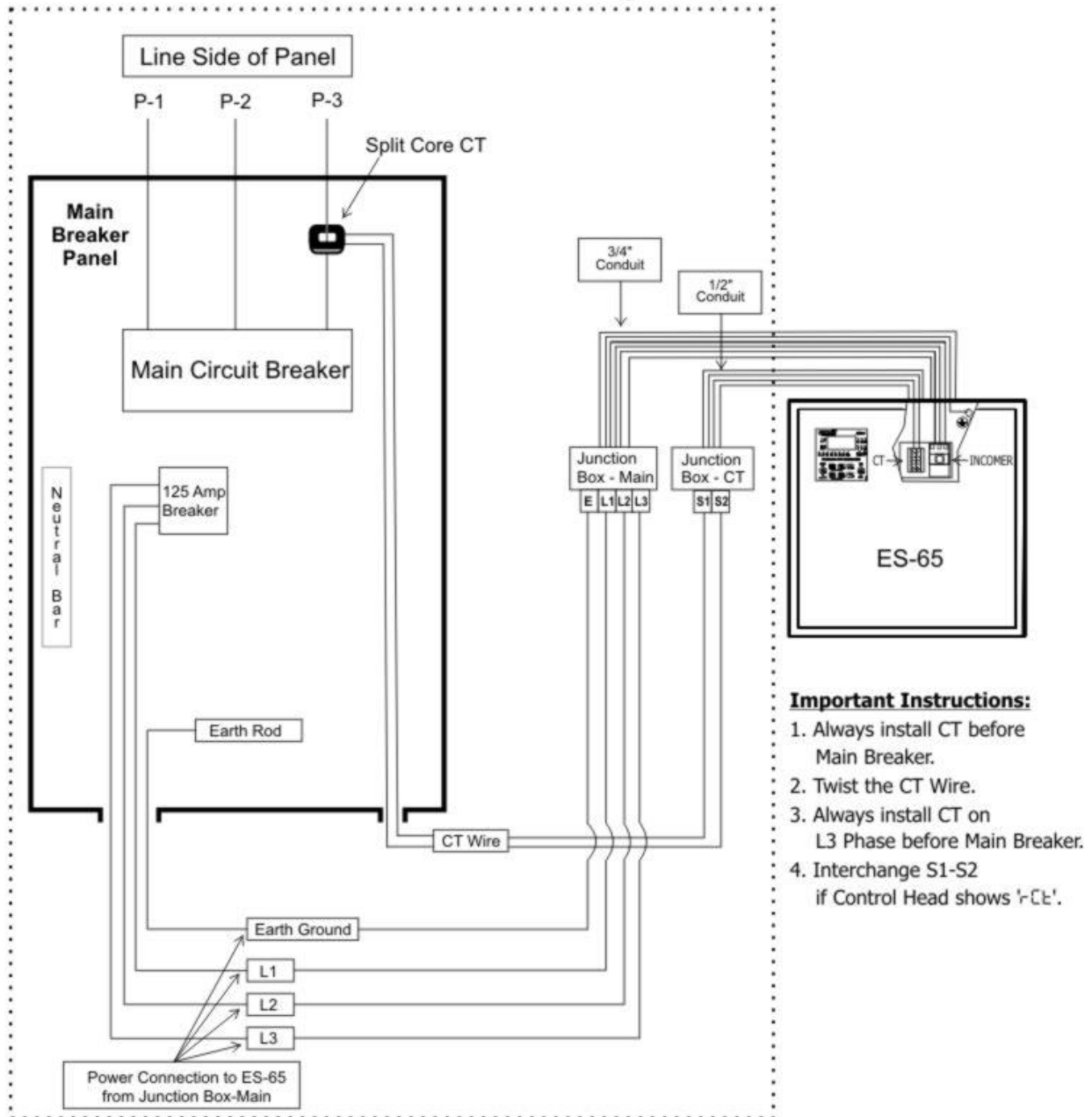
- 1.11 Switch off the external handle of load break switch (LBS), using panel key open the door of ES-65 exposing connections.
- 1.12 Locate Earth Terminal in ES-65 on the top, connect the earth wire to ES-65 Earth Terminal. Connect the other side of earth wire to main breaker panel ground rod. Ensure all mechanical connections are secure and making full contact.
- 1.13 Locate existing 3 Pole 125 Amp Circuit Breaker in the Main Breaker Panel.
  - (a) Connect the wire L1 to Phase 1 of 125 Amp circuit breaker.
  - (b) Connect the wire L2 to Phase 2 of 125 Amp circuit breaker.
  - (c) Connect the wire L3 to Phase 3 of 125 Amp circuit breaker.
- 1.14 Qualified Representative must inspect size of cable minimum 1 AWG.
- 1.15 Connect power cables to Load Break Switch of ES-65.

#### **1.2 Current Sensor Connections**

- 1.21 Open one side of Split CT (Current Sensor). Clip the CT on the wire L3 before main Circuit Breaker Panel as shown in (figure 1) page 6.
- 1.22 Locate Terminal Block T2 (S1-S2) in ES-65.
- 1.23 Qualified Representative line side of Main Panel should connect the wires 18-22 AWG from external CT to T2 (S1-S2), preferably twisted together.
- 1.24 Firmly secure current sensor to line side (L3) of main circuit breaker.

# ES-65 Field Installation Manual

## Connection Diagram



**Note:**

- All Components used for installation must be UL listed or UL recognized.
- Earth Terminal in ES-65 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-65**

## **Field Installation Manual**

### **Connection Type#2**

#### **Use these instructions**

*If 125 Amp circuit breaker is unavailable, existing blanks are available.*

**ES-65 unit is designed for use with Customer Main Breaker Panel Three Phase 277/480V AC WYE/Delta Connection, up to 1000 Ampere.**

ES-65 units should be mounted with four appropriate sized fasteners before connect to Main Breaker Panel.

1. Switch off the external handle of load break switch (LBS), using panel key open the door of ES-65 exposing connections.
2. Remove existing 3 Pole breaker blanks and install new 3 Pole 125 Amp circuit Breakers.
3. For rest of connection follow the Connection type#1 on page 5.

# **ES-65**

## **Field Installation Manual**

### **Connection Type#3**

#### **Use this instruction**

*If 125 Amp circuit breaker is unavailable and require a new disconnect switch or other approved device.*

**ES-65 unit is designed for use with Customer Main Breaker Panel Three Phase 277/480V AC WYE/Delta Connection, up to 1000 Ampere.**

**Representative must purchase 125 Amp Blade-Fused Disconnect Switch or 125 Amp Circuit Breaker for connection of ES-65 to Customer Main Breaker Panel.**

1. Install new 125 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-65 using 3/4" conduit.
3. Locate earth ground connection in ES-65 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-65

## Field Installation Manual Electrical Data Sheet

|                             |   |
|-----------------------------|---|
| Model                       | ES-65   |
| Phase Configuration         | Three Phase 277/480V AC WYE/Delta   |
| Maximum Line Voltage        | 480V AC   |
| Maximum Power               | 65 kVar   |
| Steps                       | 7   |
| Monitoring                  | PF, kVA, kVar, Volt, Current, KW, %THD-V<br>Internal Temperature & Capacitor Status                         |
| Accuracy                    | 0.7 kVar each Phase , 2.1 Kvar three Phase  |
| Frequency                   | 60Hz  |
| Protection                  | Capacitor Inbuilt Protection P2, capacitor short circuit 10,000A<br>Capacitor over current protection.      |
| Equipment Protection        | Internal design has adequate clearance and creepage distance<br>against line transients, MOVs not required. |
| Circuit breaker Required    | 125 Amp 3 pole  |
| Low Losses                  | 1.5 Watt each step  |
| Human Protection            | All High voltage shielded from contact.   |
| Operating temperature range | 40°C Ambient  |
| Dimensions(L X H X D)       | 24" X 30" X 8.5" ( 600 x 760 x 210 mm) Metal Enclosure Type 1   |
| Operating Life              | Switching tested up to 25,000 times, 6,000 as per UL  |
| Dielectric Strength         | Tested up to 3.5 kV, 1.96 kV for 1 min. as per UL   |
| Wire Gauge & Rating         | 1 AWG Str for Power, 18-22 AWG Str for CT, 8 AWG Str for Bonding  |
| Unit Weight                 | 58 kg ( 128 Pounds)   |

# ES-65

## Field Installation Manual

### Recommended Parts List

| Item                                    | Make     | Part No.      | Qty.        |
|---|----------|---------------|-------------|
| Main Wire      1 AWG Str. 600v          | Any *    | UL1015        | As required |
| CT Wire          18-22 AWG Str. 600v    | Any *    | UL1015        | As required |
| Bonding Wire    8 AWG Str. 600v         | Any *    | UL 1015       | As required |
| CT (Current Sensor)                     | Megnelab | SCT-2000-1000 | 1           |
| Wall Plug (pin type)    Size 10 x 75 mm | 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-65 unit shall be the responsibility of the qualified Electrician.