

Key Factors for Success – ELF 3200 Installation

All Installation, wiring and periodic maintenance of the ELF 3200 as well as its associated circuits involve high voltages and currents. While this document suggests several safety and reliability steps, it must be used in conjunction with the safety codes in force at your location. Failure to practice safe working procedures is likely to cause damage to the installation, severe injury and/or death. Only qualified personnel must perform all activities including handling of electrical circuits during Installation, wiring and periodic maintenance.

Neither CONZERV nor its agents may be held responsible for damage or death arising out of the wiring and / or PT, CT or other external circuits.

The covers of the ELF 3200 should never be dismantled or opened. There are no user-serviceable parts inside. The ELF 3200 contains high-precision components, which require special handling available only at authorized CONZERV service locations. High voltages are likely to be present inside even after the ELF 3200 has been switched off. Opening the covers of the ELF 3200 and/or any attempts to dismantle, service, repair or modify the unit by unauthorized persons may cause severe injury, will damage the unit and will also render CONZERV's warranty void.

	Installation steps		Recommended	Effects if not followed
1.1	Unpacking		a.) Ensure that the packaging of your ELF 3200 is not damaged.	a.) This will render CONZERV's warranty void
			b.) Do not try to open / repair the meter.	b.) This will render CONZERV's warranty void
			c.) Do not remove the protective plastic cover of your new Meters until the time of installation. Preserve the packing material.	c.) You will need the packing material if the meter needs to be shipped to CONZERV for servicing or calibration.
2.1	Panel Component Selection	External CT	a.) The meter accepts up to 6A ac rms per channel directly. Above that, a Current Transformer must be used to scale down the current.	a.) If the input current is greater than 6A, direct current connection could damage the instrument.
			b.) Use Instrument Class 1 or better CTs. These will have better accuracy compared to Protection Class CTs.	b.) Protection Class (10P10, etc.) CTs have poor accuracy and phase characteristics. If these CTs are used to feed the ELF 3200 the accuracy of measurements might be poor.
			c.) Ensure that the CT Primary rating has been selected so that your normal load variation lies between 40% and 80% of its full scale.	c.) If the CT is over-rated, say if the load is always less than 10% of the CT Primary rating and accuracy suffers. If the CT is under-rated, then you may exceed its full-scale and burn out both the CT and the meter.
			d.) With Dual - Range CTs, select the best range for programming the ELF 3200.	d.) For dual range CTs do not change the range of CTs without re-programming the ELF 3200, as the ELF 3200 will read erroneous values.
			e.) Program the selected CT ratio before you start measurements using ELF 3200.	e.) If the CT ratio that you have selected is not programmed before using the meter, the readings may be wrong.
			f.) Load current of the circuit should be 40-80% of the CT rating	f.) CTs contribute more error when operated lower than 20% of their rating.

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	Installation steps		Recommended	Effects if not followed
2.2	Panel Component Selection	External PT	a.) For input voltage above 500 V ac Line-Line an external PT connection is necessary.	a.) If the input voltage is greater than 500 V, direct voltage connection could damage the instrument
			b.) Use Instrument Class 1 or better PT's. These will have better accuracy compared to Protection Class PT's.	b.) Protection Class (10P10, etc.) PTs have poor accuracy and phase characteristics. If these PT's are used to feed the ELF 3200 the accuracy of measurements might be poor.
			c.) Program the selected PT ratio before you start measurements using ELF 3200.	c.) If the PT ratio that you have selected is not programmed before using the meter, the readings may be wrong.
2.3	Panel Component Selection	Connection Wires for CT	a.) The cable connection should be rated for 7.5A or greater and have a cross-sectional area of 16AWG minimum. Install the wiring for the current circuit at 600V ac insulation minimum.	a.) ELF 3200 has input current rating between 50mA to 6A. Thus the cable used for connecting the external CT to the meter terminals should be rated for a minimum of 7.5A.
2.4	Panel Component Selection	Connection Wires for PT	a.) The cable required to terminate the voltage sense circuit should have an insulation rating greater than 600V ac and a current rating greater than 0.1A.	a.) ELF 3200 has input voltage rating between 100v to 500v ac. Thus the cable used for connecting the external PT to the meter terminals should be rated for a minimum of 600v ac. If the cable selection is wrong this could cause damage to the instrument.
2.5	Panel Component Selection	Fuse	a.) Use a 1A fuse on each voltage input. MCB to Voltage terminals to protect against short circuit	a.) Safety of operation. Affect meter circuitry – voltage circuit may not function
			b.) Use external surge suppressors in the Auxiliary Supply Circuit.	b.) Transients, Surges, Voltage swells affect the components of the meter lead to malfunctioning (test severity is over and above the specified limits). External surge suppressors should be used in order to ensure proper operation when the voltage surges exceed the Auxiliary Supply limits.
			c.) Use fuse across auxiliary terminals – 500mA to protect against short circuit	c.) Affect meter circuitry – display goes off.
3.1	Programming Setup	CT ratio programming	a.) The CT Primary and Secondary values must be User Programmed before using the Meter according to the external circuitry connected to ELF 3200.	a.) If the CT ratio is not programmed according to the circuit connected to the meter, the readings might be wrong.
3.2	Programming Setup	PT ratio programming	a.) The PT Primary and Secondary values must be User Programmed before using the Meter. The ELF 3200 allows Field Programming of both PT Primary and Secondary voltages.	a.) If the PT ratio is not programmed according to the circuit connected to the meter, the readings might be wrong.
3.3	Programming Setup	Selection of System type	a.) For three phase four wire circuits, select the “STAR” mode. For three phase three wire circuits, select the “DELTA” mode. For single phase circuits, select “STAR” mode.	a.) If the system type (STAR/DELTA) is not programmed according to the external circuit, the readings might be wrong.
3.4	Programming Setup	Selection of %FS for ELF 3259	a.) Select the full-scale load percentage setting as per your circuit.	a.) If you do not select the correct %FS, the load % readings might not be accurate.

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4.1	Mounting	Panel cut-out, bezel, depth behind bezel	a.) Mechanical dimensions Panel cut-out dimensions are 90.5 x 43.5 mm Bezel dimensions are 96 x 48 mm Depth required behind the bezel is 40 mm	a.) If the panel dimensions are not maintained; you will not be able to mount your ELF 3200 successfully.
4.2	Mounting	Panel Spacing	a.) The panel doors must be easily opened to provide easy access to the ELF 3200 wiring for trouble-shooting.	a.) Sufficient spacing will allow ease during troubleshooting or change in wiring.
			b.) Allow clearance if the unit is going to swing out, as well as adequate slack in the wiring. Allow space for terminal blocks, CT shorting blocks, fuses, auxiliary contractors and other necessary components.	b.) Sufficient spacing will allow ease during troubleshooting or change in wiring.
4.3	Mounting	Air circulation and temperature	a.) The ELF 3200 should be separated from other equipment and sufficient space must be provided all around for cooling air to rise vertically past the instrument.	a.) Lack of sufficient air for cooling, cooling temperature higher than the specified operating temperature may result in over-heating of your ELF 3200.
			b.) The temperature of operation should lie within (-10°C to 60°C).	b.) If the operating temperature exceeds the specified range adjacent circuit/ instrument will fail and may affect the meter functionality.
			c.) The cooling air temperature must be below the specified operating temperature	c.) Sufficient cooling of the meter might not be possible.
4.4	Mounting	Dust free	a.) ELF 3200 should be mounted in a panel that provides protection from dust, moisture, oil, corrosive vapours etc.	a.) Protection of meter.
5.1	Wiring	CT wiring connection polarity and sequence	a.) Before wiring, de-energize the CT secondary by shorting it via a shorting block.	a.) If you leave the CT terminals open even momentarily when primary current is flowing, this causes high voltages that will overheat and damage the secondary of the CT and the instruments as well.
			b.) There are three pairs of Current Input terminals marked A1, A2 and A3. Each pair of input terminal is labelled as (S1, S2) and has an arrow indicating the direction of current flow.	b.) Failure to connect CTs properly results in inaccurate power readings.
			c.) For proper measurements, the phase identification as well as the polarity of the current signals must be correct.	c.) If your meter is not reading power properly, it is more than likely that the CT is incorrectly wired Or If one of the W readings is negative, that particular phase CT is reversed and must be corrected.
			d.) The Forward flow (Import by consumer) current direction must be into the S1 terminal and the exit from the S2 terminal.	d.) During the Export Mode, S1 and S2 connections should be reversed to record both the Import/Export values.
			e.) CT Mounting direction in line with current flow	e.) Negative kW, improper energy registration due to CT reversal.
			f.) Rating of panel CT and meter CT programming must be same	f.) Variation in Current, Power and Energy

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5.1	Wiring	CT wiring connection polarity and sequence	g.) Short the unused current terminals (S1, S2) together.	g.) The noise picked up by the meter may increase if the unused current terminals are not shorted together.
			h.) Shorting links of the CT to be left opened when meter is in operating condition. Short the link during maintenance, service and wiring check.	h.) Shorting of links bypass the current inputs to the meter and measurement will not take place.
5.2	Wiring	PT wiring connection polarity and sequence	a.) Before wiring, de-energize the PT secondary by opening the circuit or removing the fuse.	a.) Change of wiring connections in Power-ON condition, may result in shock, fire hazards.
			b.) There are 4 Voltage input terminals marked V1, V2, V3 and Vn. For proper meter operation, the voltage connection must be maintained. The voltage must correspond to the correct terminal.	b.) Incorrect voltage connections might result in incorrect readings.
			c.) For Delta connection, the Vn terminal should be left unconnected.	c.) Vn can be grounded or left unconnected
			d.) Use a 1A fuse on each voltage input.	d.) Safety of operation
			e.) Do not short the PT secondary.	e.) Shorting of PT secondary may cause Short circuit.
5.3	Wiring	Auxiliary supply	a.) The auxiliary supply voltage for ELF 3200 should not exceed the rating marked on the label.	a.) If the auxiliary supply voltage for ELF 3200 exceeds the marked rating on the label, the meter will be permanently damaged and CONZERV's warranty shall be void.
			b.) Use external surge suppressors in the Auxiliary Supply Circuit to ensure proper operation when the voltage surges exceed the Auxiliary Supply limits.	b.) High input voltage due to surges can cause damage the internal circuitry.
5.4	Wiring	Tools/equipment	a.) Use a power driver or a hand screwdriver for making wiring connections.	a.) Do not use POZIDRIV Tips.
			b.) Screw Head Diameter = 3.5mm, TIP Shaft Diameter <5mm	b.) Torque greater than 60 N-cm may strip the screw or break the Safety Cover.
			c.) Tightening Torque: (25 to 60) N-cm Loosening Torque: (55 to 60) N-cm Screw Travel: 6 mm less wire thickness	c.) Worn-out bits and insufficient hold-down pressure while tightening may cause the bit to ride on the screw head thus stripping and damaging it.
5.5	Wiring	Loosened screws / wiring connections	a.) No loose contact or over tightening of screws for the input voltage, current and auxiliary supply terminals.	a.) Loose wiring/open connections can cause spark, arcing across meter terminals and adjacent circuitry, affect meter functionality. Over tightening of screws leads to erosion of screw heads.
5.6	Wiring	Wiring Check	a.) Do a wiring check. For details on wiring, refer the product user manual and FAQ on our website www.conzerv.com	a.) Wrong wiring could result in erroneous readings.
6.1	Maintenance	Calibration	a.) Periodic Calibration once a year is recommended.	a.) Ensure accurate readings.
6.2	Maintenance	Wiring	a.) Look for loose/disconnected live wires	a.) Loose contact may cause wrong readings, damage to the installation (burning of cables), short circuit, malfunctioning of meter