VTC-300-R-M3

Technical Specification

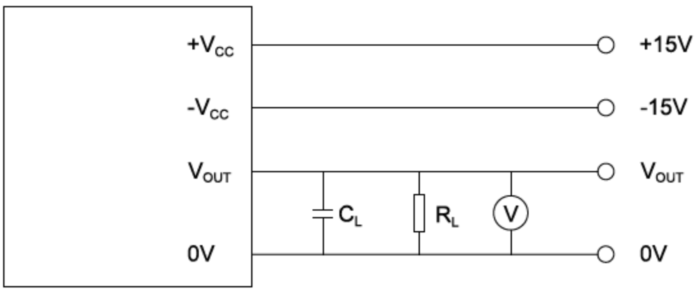
Current Transducer VTC-300-R-M3

Features :

- **Low temperature coefficient**
- **Galvanic isolation**
- **High immunity to external interference**
- **Excellent linearity**
- **Light weight design**

WARRANTY 3 YEARS ADISENS CE RoHS COMPLIANT

The VTC-300-R-M3 is an open-loop current sensor designed for the accurate measurement of DC, AC, pulsed currents, and arbitrary waveform currents. It ensures galvanic isolation between the primary and secondary circuits, making it ideal for applications where precision and safety are paramount.
Its rectangular shape allows it to be integrated into the smallest spaces, making it suitable for busbars with dimensions up to 20.5 mm x 15 mm.



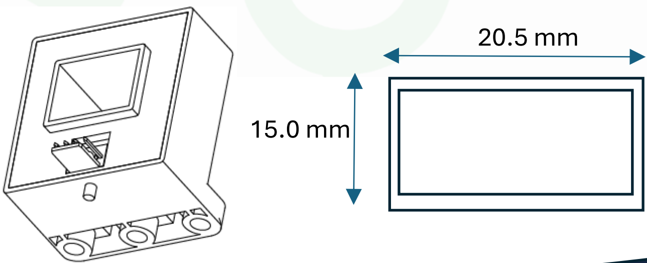
Applications :

- • **AC variable speed drives**
- • **Static converters for DC motor drives**
- • **Battery supplied applications**
- • **Switched Mode Power Supplies(SMPS)**
- • **Uninterruptible Power Supplies(UPS)**
- • **Power supplies for welding applications**

Part Number	Primary Nominal Current	Pimary Current Measuring Range
VTC-300-R-M3	300A	±900 A

Application Domaine:

- Industrial



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SPECIFICATIONS:

T_A = +25°C , V_{CC} = ± 15V , R_L = 10 Ω , unless otherwise noted

Parameter	Symbol	Condition	Min	Typ	Max	Unit
ELECTRICAL DATA						
Primary nominal r.m.s Current	I_{PN}		-	300	-	A
Primary Current measuring range	I_{PM}		-900	-	900	A
Output Voltage	V_{OUT}	VOE + S × IP	-	4	-	mV
Sensitivity	S	I_p=0 To ± I_{PN}	-	13.33	-	mV/A
Supply Voltage	V_{CC}	±5%	-	±15	-	V
Current Consumption	I_C	I_P=0	-	±20	-	mA
Load Resistance	R_L	I_p=0 To ± I_{PN}	1	10	-	KΩ
Load Capacitance	C_L	I_p=0 To ± I_{PN}	-	100	-	pF
STATIC PERFORMANCE DATA						
Linearity Error	ε_L	T_A = -40 °C to +85 °C, I_P = 0 to ±I_{PN}	-	0.4	0.8	% I_{PN}
Accuracy	X_G	T_A = +25 °C, I_P = 0 to ±I_{PN}	-1	±0.5	1	% I_{PN}
		T_A = -40 °C to +85 °C, I_P = 0 to ±I_{PN}	-3.5	±1.5	3.5	
Sensitivity Error	ε_S	TA = -40 °C to +85 °C, IP = 0 to ±IPN	-2	-	2	%
Symmetry	ε_{SYM}	TA = -40 °C to +85 °C, IP = 0 to ±IPN	99	100	101	%
Hysteresis	V_{OH}	T_A = -40 °C to +85 °C, I_P = ±I_{PN} → 0	-20	±10	20	mV
Electric Offset	V_{OE}	T_A = +25 °C, I_P = 0	-20	±10	20	mV
		TA = -40 °C to +85 °C, IP = 0	-60	±20	60	
DYNAMIC PERFORMANCE DATA						
Response Time	Tr	di/dt > 50 A/µs, 10% to 90% of I_{PN}	0.9	2	-	µs
Bandwidth	BW	-1 dB	DC	50	-	kHz

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2. TYPICAL OUTPUT CHARACTERISTICS

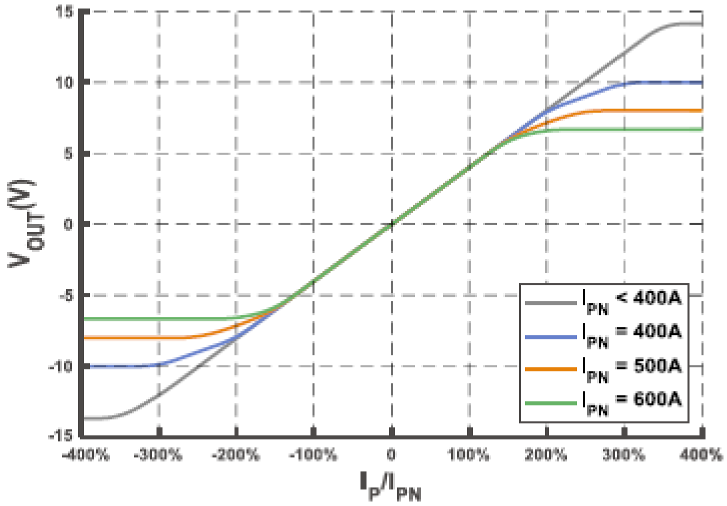

Figure 1. Output voltage versus primary current

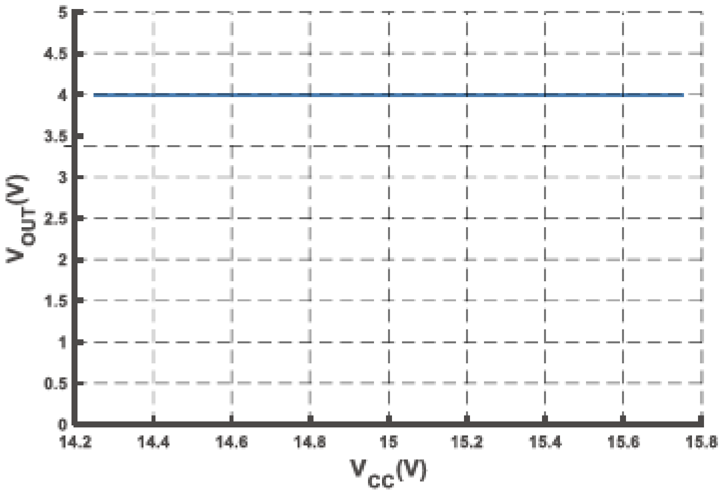

Figure 2. Output voltage versus supply voltage (@IP = IPN)

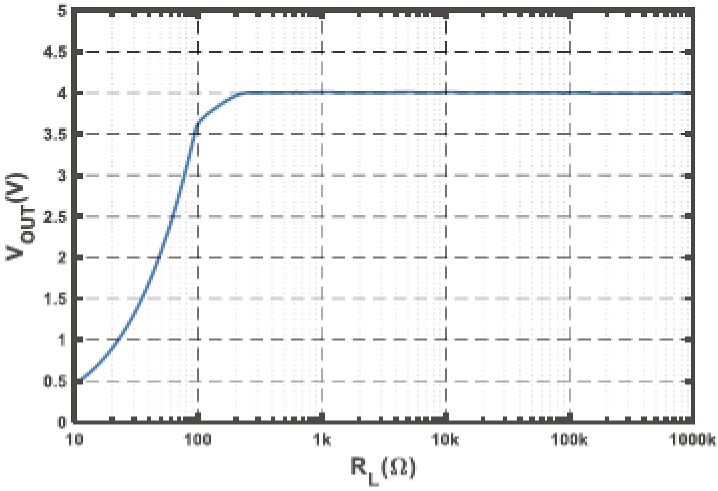

Figure 3. Output voltage versus load resistance (@IP = IPN)

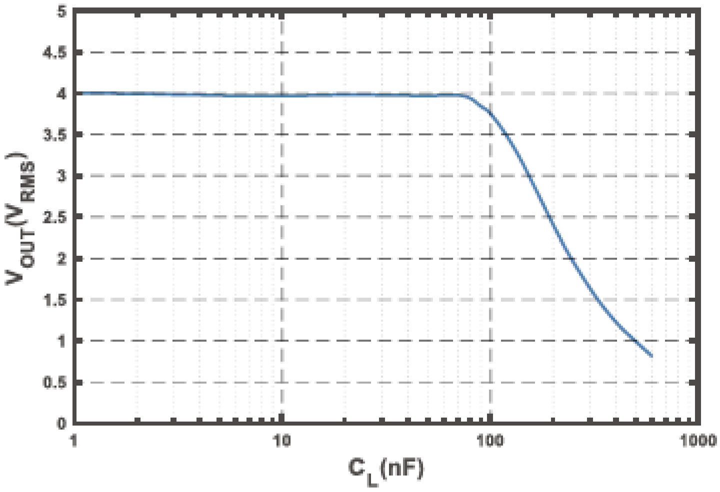

Figure 4. Output voltage versus load capacitance (@IP = IPN)

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3. TYPICAL TEMPERATURE CHARACTERISTICS

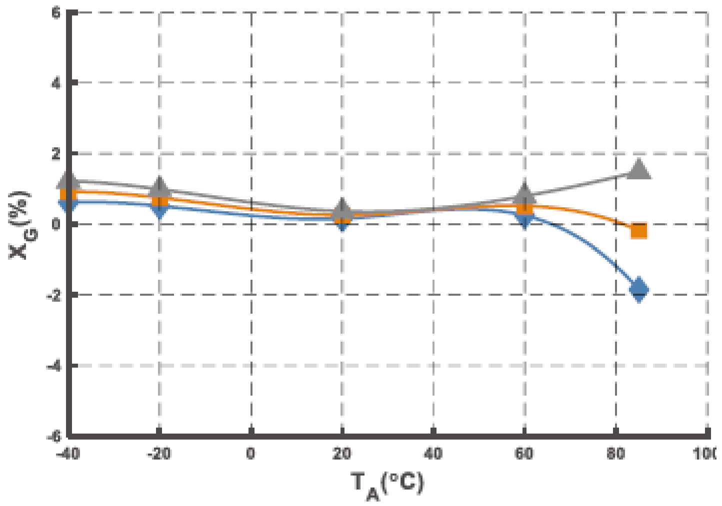

Figure 5. Total error versus ambient temperature

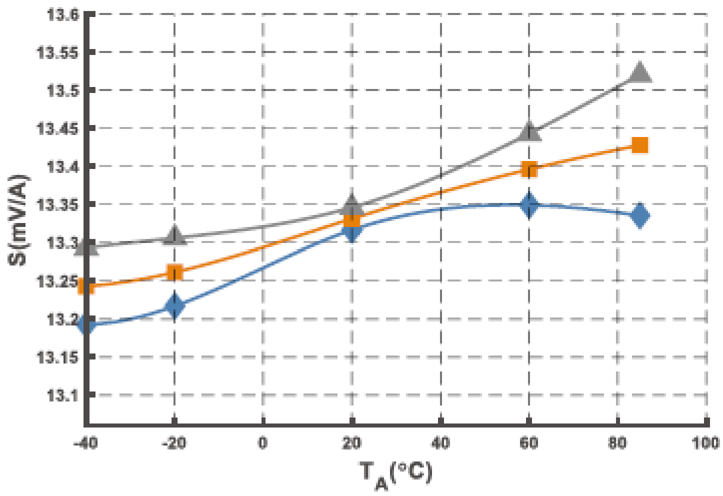

Figure 6. Sensitivity @IPN = 300 A versus ambient temperature

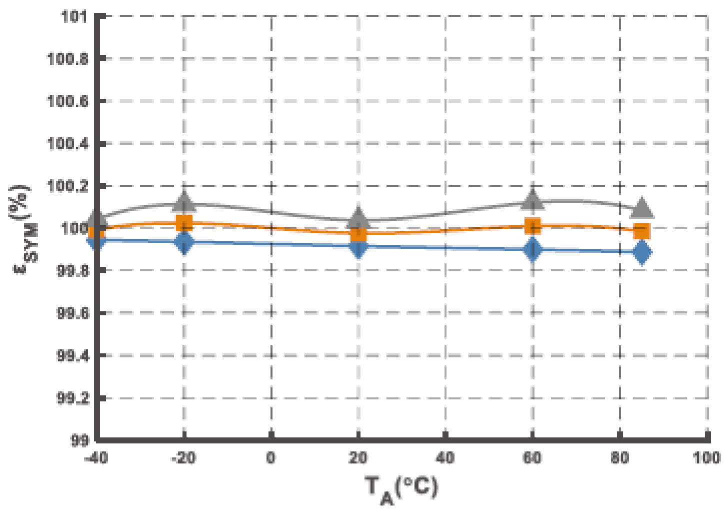

Figure 7. Symmetry versus ambient temperature

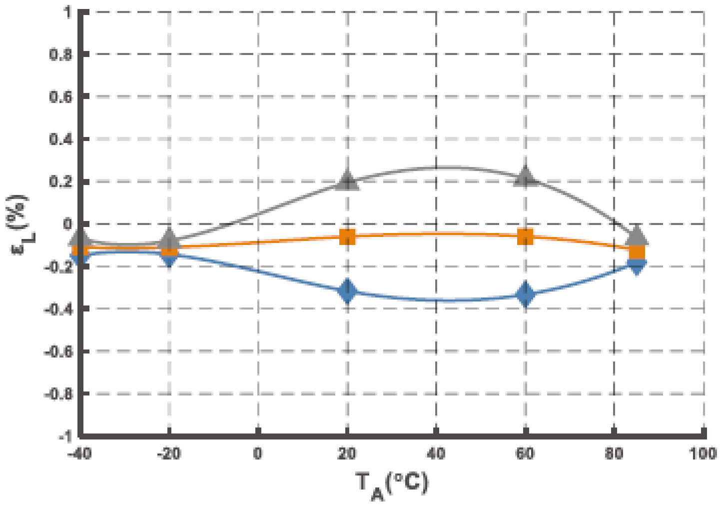

Figure 8. Linearity error versus ambient temperature

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4. INSULATION AND ENVIRONMENTAL CHARACTERISTICS

Parameter	Symbol	Typical	Unit
Dielectric Strength	V_D	5	kV(50Hz, 1min)
Insulation Resistance	R_{IS}	1000	MΩ
Creepage Distance	d_{CP}	30	mm
Clearance	d_{CL}	9	mm
Ambient Operating Temperature	T_A	-40 to +85	°C
Ambient Storage Temperature	T_{STG}	-40 to +85	°C
Mass	m	63	g

5. PARAMETERS DEFINITION AND FORMULA

1) Output Voltage:

$$V_{OUT} = V_{OE} + S \times I_P$$

V_{OUT} stands for current sensor output voltage at given primary current, V_{OE} stands for electric offset, S stands for sensitivity, I_P stands for primary current.

2) Accuracy

$$X_G = MAX_{I_P \in [-I_{PN}, I_{PN}]} \left[\frac{V_{OUT} - (S \times I_P)}{S \times I_{PN})} \times 100\% \right]$$

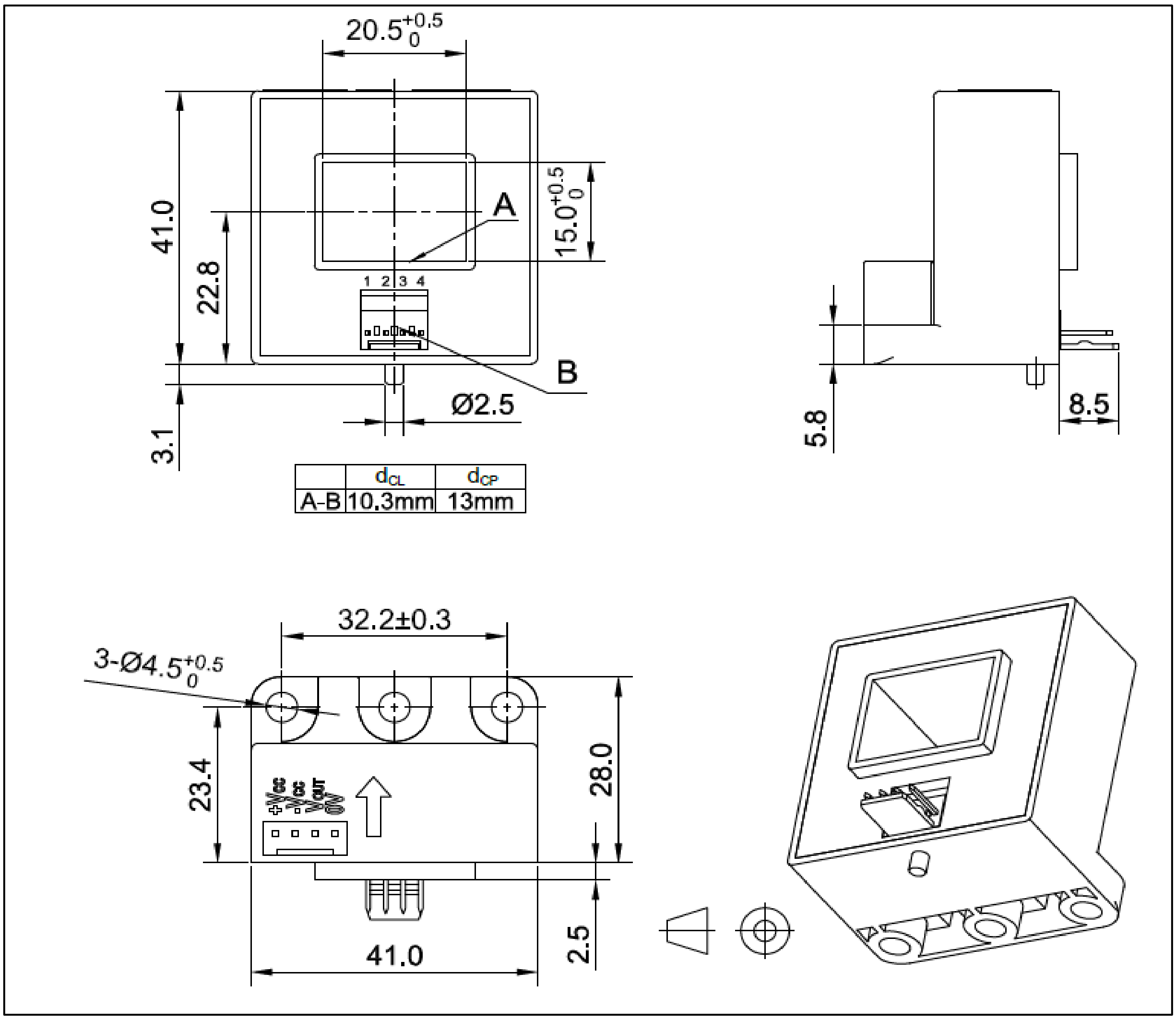
I_{PN} stands for nominal primary current

3) Sensitivity

$$S = \frac{V_{OUT(@ I_{PN})} - V_{OUT(@ -I_{PN})}}{2 \times I_{PN}}$$

$V_{OUT(@ I_{PN})}$ and $V_{OUT(@-I_{PN})}$ stand for the voltage output at I_{PN} and $-I_{PN}$ respectively.

6. DIMENSIONS



	d_{CL}	d_{CP}
A-B	10.3mm	13mm

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7. MOUNTING RECOMMENDATION

1.**Mounting method**: 3 × Φ 4.5 mm holes (pick one)

1 × M4 copper or SS304 screw (recommended applied torque 0.75 N•m)

2.**Primary through-hole dimensions**: 20 mm × 15 mm

3.**Secondary terminal**:

Molex 22041041

Crimp Housing: Molex 22011042, Crimping Terminal: Molex 08500113

REMARKS

1. VOUT is positive when the primary current is in the same direction as the arrow indication on the label and vice versa.
2. Improper connection can cause permanent damage of the sensor.
3. Excessive capacitive load may result in distortion of output signals when measuring high frequency primary signal. Please refer to Output Voltage vs Load Capacitance Curve.
4. Dynamic performances (di/dt and response time) are best with a single busbar completely filling the primary hole.
5. Sensor is customizable upon request.

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1. General Safety Warnings

- **Intended Use**: This transducer is designed for installation in electrical and electronic systems. It must be used in compliance with applicable international standards, such as **IEC 61010-1**, as well as local regulations and codes.
- **Applicable Standards**: The transducer must be operated according to the Adisens's operating instructions to ensure compliance with relevant safety standards, including:
  - **IEC 61010-1**: Safety requirements for electrical equipment for measurement, control, and laboratory use.
  - **EN 50178**: Safety requirements for electronic equipment for power installations.
- **Installation by Qualified Personnel**: Only qualified professionals, trained in handling high-voltage systems and electrical components, should install, commission, and maintain the transducer. Misuse or incorrect installation may result in electric shock, fire, or severe equipment damage.

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2. Electrical Shock Risk

- **Risk of Electric Shock**: This transducer operates in high-voltage environments. It must be handled with care to avoid direct contact with live electrical components. There is a risk of serious injury or death from electric shock if proper precautions are not taken.
- **Limited-Energy Secondary Circuits**: To ensure safe operation, this transducer must be used exclusively within limited-energy secondary circuits, as specified by **IEC 61010-1**, which governs the safe design of electrical circuits to reduce the risk of injury and electrical hazards.
- **Isolation Requirements**: This transducer provides galvanic isolation between the primary (high-power) and secondary (low-power) circuits. However, the device should not be assumed to provide absolute protection against electric shock. Always de-energize circuits before installation or maintenance.

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3. Installation Precautions

- **Environmental Conditions**: The transducer is designed to operate in controlled environments. Ensure that the operating temperature, humidity, and surrounding conditions comply with the transducer's specifications provided in the technical datasheet. Avoid exposure to moisture, corrosive environments, or areas prone to electrical interference.
- **Mounting**: Secure the transducer properly in a location that prevents movement or vibration during operation. Improper mounting may cause electrical arcing or contact with live components.
- **Grounding**: Ensure that the transducer is correctly grounded in accordance with the electrical system design. This will help prevent electric shock and improve system safety and performance.

4. Operational Guidelines

- **Operating Limits**: Operate the transducer strictly within the specified voltage, current, and temperature ranges. Overloading the transducer beyond its rated capacity may result in equipment failure or create safety hazards.
- **Routine Maintenance**: Inspect the transducer regularly for signs of wear, damage, or abnormal operation. Discontinue use if any issues are detected and consult the manufacturer for replacement or repair.

5. Handling and Storage

- **Handling Precautions**: Avoid direct contact with transducer terminals during handling. Always handle the device with protective gear, including insulated gloves, to avoid accidental electric shock.
- **Storage Conditions**: Store the transducer in a clean, dry, and temperature-controlled environment. Prolonged exposure to harsh conditions may degrade performance and compromise safety.

6. Emergency Procedures

- **Power Disconnection**: In case of a malfunction, electrical fault, or other emergency, immediately disconnect the power supply to the transducer and seek professional assistance for inspection and repair.
- **First Aid**: If an electric shock occurs, follow established first aid protocols and seek emergency medical assistance immediately.

7. Disposal

- **Environmental Considerations**: Dispose of the transducer according to local regulations for electronic waste. Do not incinerate, and avoid disposing of the device in general waste, as it may contain hazardous materials.

8. Manufacturer’s Support

For additional information, technical support, or to report any issues with the transducer, please contact un on contact@adisens.fr . Ensure that you have the model number, serial number, and installation details on hand for a prompt response.

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