

November 2020

# Labor Market Analysis

## Industrial Electronics



Prepared by the Central Valley/Mother Lode Center of Excellence

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**COVID-19 Statement:** This report includes employment projection data by EMSI. EMSI's projections are modeled on recorded (historical) employment figures and incorporate several underlying assumptions, including the assumption that the economy during the projection period will be at approximately full employment or potential output. To the extent that a recession or labor shock, such as the economic effects of COVID-19, can cause long-term structural change, they may impact the projections. At this time, it is not possible to quantify the impact of COVID-19 on projections of industry and occupational employment. Other measures such as unemployment rates and monthly industry employment estimates will reflect the most recent information on employment and jobs in the state and, in combination with input from local employers, may help validate current and future employment needs as depicted here.

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# Summary

Please note the COVID-19 statement on page 2 when considering this report's findings.

This study conducted by the Central Valley/Mother Lode Center of Excellence examines labor market demand, wages, skills, and postsecondary supply for industrial electronics. Five occupations related to industrial electronics were identified for Taft College:

- 17-3023, Electrical and Electronic Engineering Technologists and Technicians
- 49-9043, Maintenance Workers, Machinery
- 17-3026, Industrial Engineering Technologists and Technicians
- 17-3024, Electro-Mechanical and Mechatronics Technologists and Technicians
- 17-3027, Mechanical Engineering Technologists and Technicians

## Key findings:

- **Occupational demand** — Nearly 2,000 workers were employed in jobs related to industrial electronics in 2019 in the South Central Valley/Southern Mother Lode (SCV/SML) subregion. The largest occupation is electrical and electronic engineering technologists and technicians with 986 workers in 2019, a projected growth rate of 1% over the next five years, and 100 annual openings.
- **Wages** — Budget analysts earn the highest entry-level wages, \$29.25/hour in the subregion and \$28.64/hour in the region.
- **Employers** — Employers with the most job postings in the subregion are Lockheed Martin Corporation, DynCorp International, and Naes.
- **Occupational titles** — The most common occupational title in job postings in the subregion is industrial engineering technicians. The most common job title is maintenance technician.
- **Skills and certifications** — The top baseline skill is troubleshooting, the top specialized skill is repair, and the top software skill is Microsoft Office. The most in-demand certification is a driver's license.
- **Education** — Four of the five occupations typically require an associate degree. A high school diploma or equivalent is typically required for maintenance workers, machinery.
- **Supply** — Analysis of postsecondary completions in the region shows that on average 192 awards were conferred in the Central Valley/Mother Lode region each year.

Based on a comparison of occupational demand and supply, there is an undersupply of 54 trained workers in the subregion and 81 workers in the region. The Center of Excellence recommends that Taft College work with the Advanced Manufacturing Regional Director, the college's advisory board, and local industry in the development of programs to address the shortage of industrial electronics workers in the region.

# Introduction

The Central Valley/Mother Lode Center of Excellence was asked by Taft College to provide labor market information for industrial electronics. The geographical focus for this report is the South Central Valley/Southern Mother Lode (SCV/SML) subregion, but regional demand and supply data has been included for broader applicability and use.

The average living wage for a single adult in the South Central Valley/Southern Mother Lode (SCV/SML) subregion is \$10.30/hour.<sup>1</sup>

Analysis of the program and occupational data related to industrial electronics resulted in the identification of applicable occupations. The Standard Occupational Classification (SOC) System codes and titles used in this report are:

- 17-3023, Electrical and Electronic Engineering Technologists and Technicians
- 49-9043, Maintenance Workers, Machinery
- 17-3026, Industrial Engineering Technologists and Technicians
- 17-3024, Electro-Mechanical and Mechatronics Technologists and Technicians
- 17-3027, Mechanical Engineering Technologists and Technicians

The occupational titles, job descriptions, sample job titles, and knowledge and skills from the Bureau of Labor Statistics and O\*NET OnLine are shown below. O\*NET data was not available for electrical and electronic engineering technologists and technicians, industrial engineering technologists and technicians, electro-mechanical and mechatronics technologists and technicians, and mechanical engineering technologists and technicians.

## **Maintenance Workers, Machinery**

**Job Description:** Lubricate machinery, change parts, or perform other routine machinery maintenance.

**Knowledge:** Mechanical, Mathematics, Design, English Language, Engineering and Technology

**Skills:** Equipment Maintenance, Operation Monitoring, Repairing, Troubleshooting, Operation and Control

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<sup>1</sup> The term "living wage" in Center of Excellence reports is calculated by averaging the self-sufficiency wages from the Insight Center's California Family Needs Calculator for each county in the subregion: <https://insightccd.org/tools-metrics/self-sufficiency-standard-tool-for-california/>.

# Occupational Demand

The South Central Valley/Southern Mother Lode subregion employed 1,986 workers in industrial electronics occupations in 2019 (Exhibit 1). The largest occupation is electrical and electronic engineering technologists and technicians with 986 workers in 2019. This occupation is projected to grow by 1% over the next five years and has the greatest number of projected annual openings, 100.

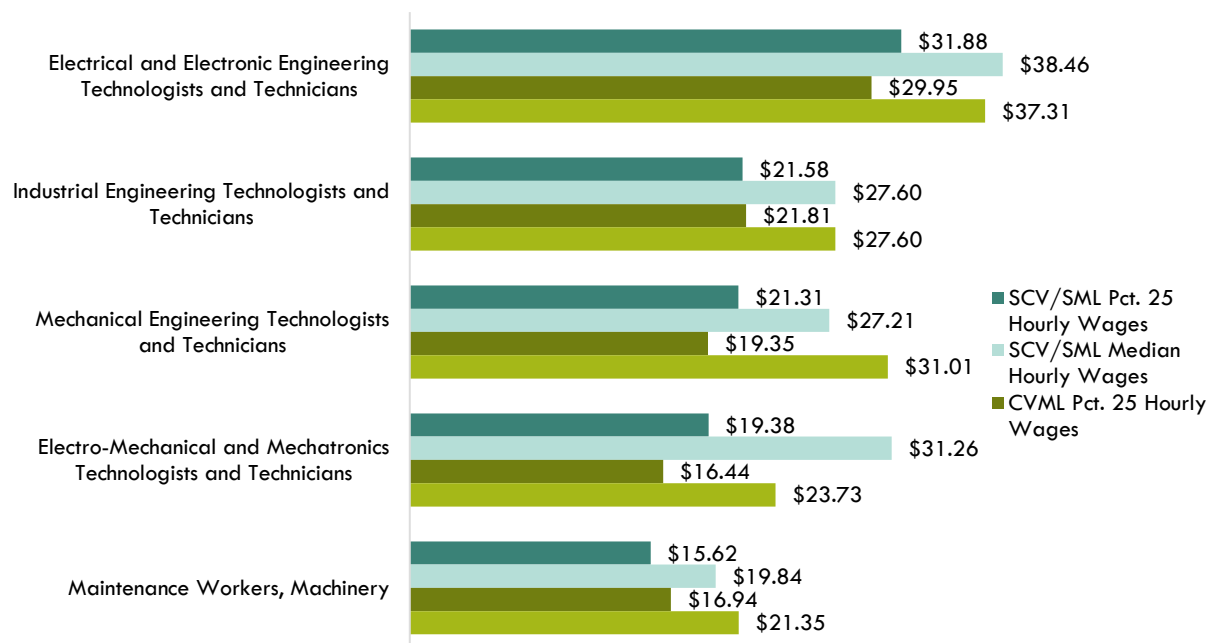
**Exhibit 1. Industrial electronics employment and occupational projections in the SCV/SML subregion**

Occupation	2019 Jobs	2024 Jobs	5-Year Change	5-Year % Change	Annual Openings
Electrical and Electronic Engineering Technologists and Technicians	986	995	9	1%	100
Maintenance Workers, Machinery	680	708	28	4%	69
Industrial Engineering Technologists and Technicians	130	135	5	4%	14
Electro-Mechanical and Mechatronics Technologists and Technicians	100	100	0	0%	10
Mechanical Engineering Technologists and Technicians	91	96	5	5%	10
Electrical and Electronic Engineering Technologists and Technicians	986	995	9	1%	100
<b>TOTAL</b>	<b>1,986</b>	<b>2,034</b>	<b>48</b>	<b>2%</b>	<b>203</b>

## Wages

Exhibit 2 compares the entry-level and experienced wages of the industrial electronics occupations. Electrical and electronic engineering technologists and technicians earn the highest entry-level wages, \$31.88/hour in the subregion and \$29.96/hour in the region.

**Exhibit 2. Entry-level and experienced wage comparison in the SCV/SML subregion and region**



# Job Postings

There were 565 job postings for the five occupations in the SCV/SML subregion from May to October 2020.<sup>2</sup> The employers with the most job postings are listed in Exhibit 3.

**Exhibit 3. Top employers of industrial electronics occupations by number of job postings**

Employer	Job Postings	% Job Postings
Lockheed Martin Corporation	11	2%
DynCorp International	9	2%
Naes	9	2%
The Boeing Company	7	2%
Jt4 Llc	6	1%
Pacific Gas and Electric Company	6	1%
Saalex Solutions Incorporated	6	1%
Walmart / Sam's	6	1%
Amazon	5	1%
Bakersfield	5	1%

Exhibit 4 shows how job postings for the targeted occupations in the SCV/SML subregion are distributed across seven O\*NET OnLine occupations. The occupational title industrial engineering technicians is listed in 320 job postings. Note how a higher proportion of job postings are for this occupational title. Common job titles in postings include maintenance technician in 73 job postings, electrical technician in 14 job postings, and automation technician in 13 job postings.

**Exhibit 4. Top occupational titles in job postings for industrial electronics**

Occupational Title	Job Postings	% of Job Postings
Industrial Engineering Technicians	320	57%
Electronics Engineering Technicians	135	24%
Electro-Mechanical Technicians	70	12%
Mechanical Engineering Technicians	16	3%
Maintenance Workers, Machinery	13	2%
Robotics Technicians	7	1%
Electrical Engineering Technicians	4	1%

## Salaries

Exhibit 5 shows the “Market Salaries” for industrial electronics occupations that are calculated by Burning Glass which uses a machine learning model built off of millions of job postings every year, and accounts for adjustments based on locations, industry, skills, experience, education requirements, among other variables.

<sup>2</sup> Other than occupation titles and job titles, the categories below can be counted one or multiple times per job posting, and across several areas in a single posting. For example, a skill can be counted in two different skill types, and an employer can indicate more than one education level.

### Exhibit 5. Salaries for industrial electronics

Market Salary Percentile	Salary Amount
10th Percentile	\$30,955
25th Percentile	\$35,658
50th Percentile	\$41,394
75th Percentile	\$48,314
90th Percentile	\$59,288

### Education

Of the 565 job postings, 296 listed an education level preferred for the positions being filled. Among those, 81% requested high school or vocational training, 27% requested an associate degree, and 12% requested a bachelor's degree (Exhibit 6). A job posting can indicate more than one education level. Hence, the percentages shown in the chart below total more than 100%.

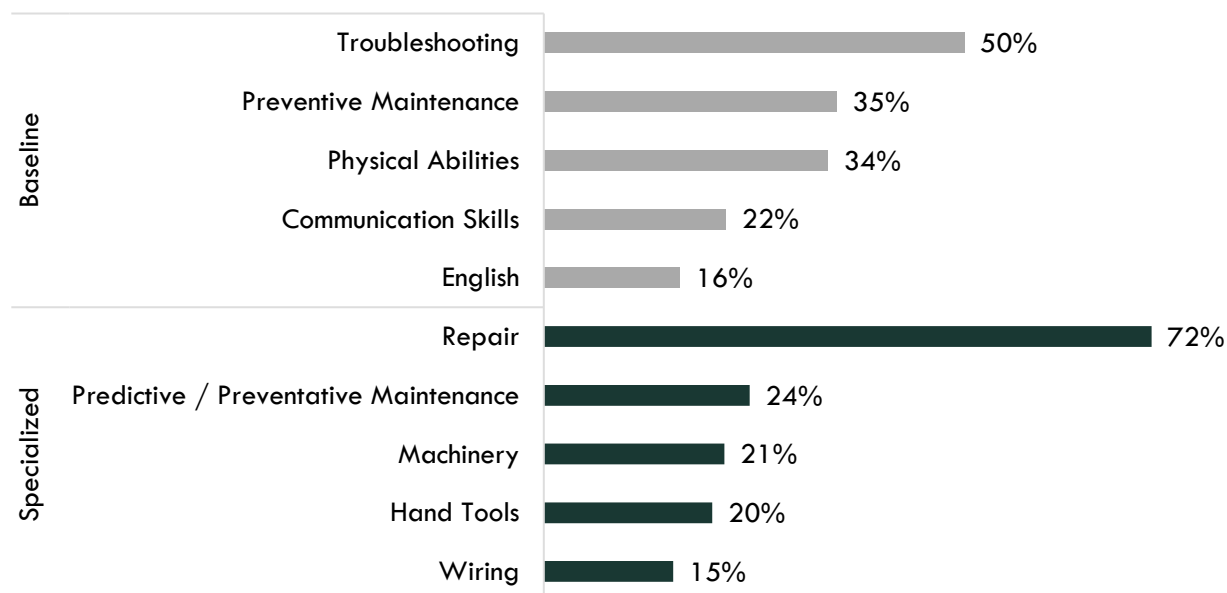
### Exhibit 6. Education levels requested in job postings for industrial electronics

Education level	Job Postings	% of Job Postings
High school or vocational training	240	81%
Associate degree	79	27%
Bachelor's degree	35	12%

### Baseline and Specialized Skills

Exhibit 7 depicts the top baseline and specialized skills for the targeted occupations. The three most important baseline skills are troubleshooting, 50% of job postings, preventive maintenance, 35%, and physical abilities, 34%. The top three specialized skills are repair, 72% of job postings, predictive/preventive maintenance, 24%, and machinery, 21%.

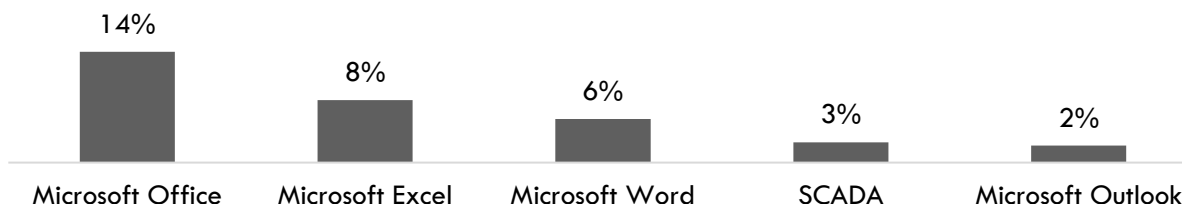
### Exhibit 7. In-demand industrial electronics baseline and specialized skills



### Software Skills

Analysis also included the software skills most in demand by employers. Microsoft Office and Excel were the top two software skills identified in job postings (Exhibit 8).

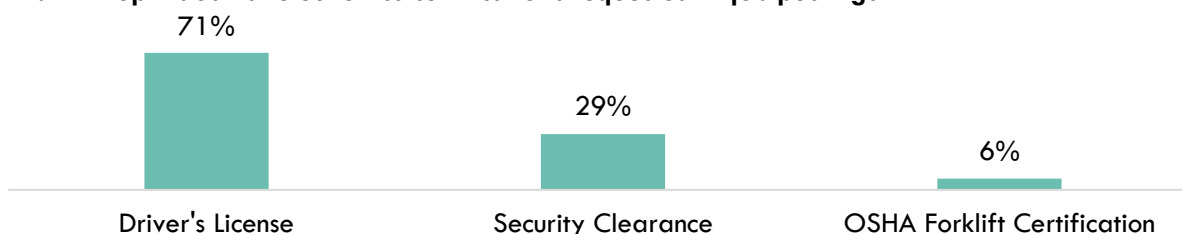
**Exhibit 8. In-demand industrial electronics software skills**



### Certifications

Of the 565 job postings, 238 contained certification data. Among those, 71% indicated a need for a driver's license. The next top certifications are security clearance and OSHA forklift certification (Exhibit 9). (Due to the low number of job postings with certifications listed, the chart below may not be representative of the full sample.)

**Exhibit 9. Top industrial electronics certifications requested in job postings**



## Education, Work Experience & Training

Four of the five occupations typically require an associate degree (Exhibit 10). A high school diploma or equivalent is typically required for maintenance workers, machinery.

**Exhibit 10. Education, work experience, training, and Current Population Survey results for industrial electronics occupations<sup>3</sup>**

Occupation	Typical Entry-level Education	Work Experience Required	Typical On-The-Job Training
Electrical and Electronic Engineering Technologists and Technicians	Associate degree	None	None
Maintenance Workers, Machinery	High school diploma or equivalent	None	Long-term
Industrial Engineering Technologists and Technicians	Associate degree	None	None
Mechanical Engineering Technologists and Technicians	Associate degree	None	None
Electro-Mechanical and Mechatronics Technologists and Technicians	Associate degree	None	None

<sup>3</sup> "Labor Force Statistics from the Current Population Survey," Bureau of Labor Statistics, <https://www.bls.gov/cps/>.



# Supply

Program data from the California Community Colleges Chancellor's Office Data Mart Taxonomy of Programs (TOP) codes: 093400 - Electronics and Electric Technology, 093420 - Industrial Electronics, 093500 - Electro-Mechanical Technology, and the Integrated Postsecondary Educational Data System Classification of Instructional Programs (CIP) codes: 15.0303 - Electrical, Electronic and Communications Engineering Technology/Technician was identified and evaluated. Analysis of the last three years of TOP code data shows that, on average, 192 awards were conferred in the Central Valley/Mother Lode region each year (Exhibit 11).

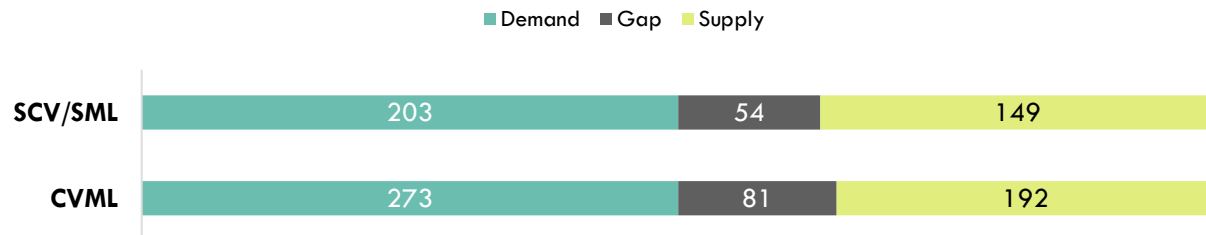
**Exhibit 11. Postsecondary supply for industrial electronics occupations in the region**

TOP Code - Title	Colleges	Associate Degree	Bachelor's Degree	Certificate 12 < 18 semester units	Certificate 18 < 30 semester units	Certificate 30 < 60 semester units	Certificate 6 < 18 semester units	Subtotal
093400 - Electronics and Electric Technology	Bakersfield	11				11	52	74
	Fresno City	13			1	11		25
	Merced	1				2		3
	San Joaquin Delta					10		10
	Sequoias				1		1	2
093420 - Industrial Electronics	Fresno City			21				21
	Merced	1				0		1
	Modesto	7				6	1	14
093500 - Electro-Mechanical Technology	Bakersfield	6	6		2			14
	San Joaquin Delta	1			2			3
15.0303 - Electrical, Electronic and Communications Engineering Technology/Technician	ITT Technical Institute-Clovis	12						12
	ITT Technical Institute-Lathrop	12						12
<b>TOTAL</b>		<b>64</b>	<b>6</b>	<b>21</b>	<b>5</b>	<b>40</b>	<b>55</b>	<b>192</b>

## Gap Analysis

There is an undersupply of 54 industrial electronics workers in the SCV/SML subregion and 81 workers in the region (Exhibit 12).

**Exhibit 12. Industrial electronics workforce annual demand and supply in the SCV/SML subregion and region**



## Student Outcomes

Exhibit 13 summarizes employment and wage outcomes from the California Community College Chancellor's Cal-PASS Plus LaunchBoard for the TOP code related to industrial electronics. There were 51 electronics and electric technology students, 24 industrial electronics students, and 24 electro-mechanical technology students who received a degree, certificate or attained apprenticeship journey status.

**Exhibit 13. Regional metrics for the TOP code related to industrial electronics**

Metric	093400 - Electronics and Electric Technology	093420 - Industrial Electronics	093500 - Electro-Mechanical Technology
Students Who Got a Degree or Certificate or Attained Apprenticeship Journey Status	51	24	24
Number of Students Who Transferred	56	*	*
Job Closely Related to Field of Study	75%	63%	*
Median Change in Earnings	33%	33%	65%
Attained a Living Wage	68%	78%	84%
* denotes data not available.			

## Conclusion

The entry-level wages of the five occupations exceed the SCV/SML subregion's average living wage. There were 565 job postings in the past six months for occupations related to industrial electronics in the subregion. Analysis of skills and certification requirements in job postings indicates:

- The top baseline skill is troubleshooting, and the top specialized skill is repair.
- The top software skill is Microsoft Office.
- The top certification is a driver's license.

There is an undersupply of trained workers, a shortage of 54 in the SCV/SML subregion and 81 in the region.

## Recommendation

Based on these findings, it is recommended that Taft College work with the Advanced Manufacturing Regional Director, the college's advisory board, and local industry in the development of programs to address the shortage of industrial electronics in the region.

# Appendix A: Methodology & Data Sources

## Data Sources

Labor market and educational supply data compiled in this report derive from a variety of sources. Data were drawn from external sources, including the Economic Modeling Specialists, Inc., the California Community Colleges Chancellor's Office Management Information Systems Data Mart and the National Center for Educational Statistics (NCES) Integrated Postsecondary Education Data System (IPEDS). Below is the summary of the data sources found in this study.

Data Type	Source
Labor Market Information/Population Estimates and Projections/Educational Attainment	Economic Modeling Specialists, Intl. (EMSI). EMSI occupational employment data are based on final EMSI industry data and final EMSI staffing patterns. Wage estimates are based on Occupational Employment Statistics (QCEW and Non-QCEW Employees classes of worker) and the American Community Survey (Self-Employed and Extended Proprietors). Occupational wage estimates also affected by county-level EMSI earnings by industry: <a href="http://economicmodeling.com">economicmodeling.com</a> .
Typical Education Level and On-the-job Training	Bureau of Labor Statistics (BLS) uses a system to assign categories for entry-level education and typical on-the-job training to each occupation for which BLS publishes projections data: <a href="https://www.bls.gov/emp/tables/educational-attainment.htm">https://www.bls.gov/emp/tables/educational-attainment.htm</a> .
Labor Force, Employment and Unemployment Estimates	California Employment Development Department, Labor Market Information Division: <a href="http://labormarketinfo.edd.ca.gov">labormarketinfo.edd.ca.gov</a> .
Job Posting and Skills Data	Burning Glass: <a href="http://burning-glass.com/">burning-glass.com/</a> .
Additional Education Requirements/ Employer Preferences	The O*NET Job Zone database includes over 900 occupations as well as information on skills, abilities, knowledge, work activities and interests associated with specific occupations: <a href="http://onetonline.org">onetonline.org</a> .

## Key Terms and Concepts

**Annual Job Openings:** Annual openings are calculated by dividing the number of years in the projection period by total job openings.

**Education Attainment Level:** The highest education attainment level of workers age 25 years or older.

**Employment Estimate:** The total number of workers currently employed.

**Employment Projections:** Projections of employment are calculated by a proprietary Economic Modeling Specialists, Intl. (EMSI) formula that includes historical employment and economic indicators along with national, state and local trends.

**Living Wage:** The cost of living in a specific community or region for one adult and no children. The cost increases with the addition of children.

**Occupation:** An occupation is a grouping of job titles that have a similar set of activities or tasks that employees perform.

**Percent Change:** Rate of growth or decline in the occupation for the projected period; this does not factor in replacement openings.

**Replacements:** Estimate of job openings resulting from workers retiring or otherwise permanently leaving an occupation. Workers entering an occupation often need training. These replacement needs, added to job openings due to growth, may be used to assess the minimum number of workers who will need to be trained for an occupation.

**Total Job Openings (New + Replacements):** Sum of projected growth (new jobs) and replacement needs. When an occupation is expected to lose jobs, or retain the current employment level, number of openings will equal replacements.

**Typical Education Requirement:** represents the typical education level most workers need to enter an occupation.

**Typical On-The-Job Training:** indicates the typical on-the-job training needed to attain competency in the skills needed in the occupation.