WAGE GRADE CAREER PATH

WG 3359	Instrument Mechanic

This occupation covers nonsupervisory jobs involved in installing, aligning, modifying, troubleshooting, repairing, overhauling, testing, and calibrating a variety of instruments containing electric, mechanical, pneumatic, hydraulic, and/or electronic components, assemblies, and controls. The work includes using both manual and automated test equipment such as pneumatic, hydraulic, or vacuum test stands or computer controlled electronic test consoles to test, align, and calibrate instruments. The work also includes maintaining, repairing, and calibrating precision instruments and standards such as dial indicators, concentricity gauges, sinebars, micrometers, and plug and ring gauges. The work requires knowledge and application of electrical and mechanical principles; knowledge of pneumatic and/or hydraulic mechanisms; and, in some work situations, knowledge of electronic principles and theory.

WG02 - WG05	Step	Part 1 Apprentice/Helper/Trainee; Trade/Less than Journeyman
	1	Complete New Hire Orientation
	2	Complete Civilian Training Plan requirements for current position
	3	Complete task qualifications for current position
	4	Complete task certifications for current position
	5	Master simple to common work tasks under supervision
	6	Maintain successful to above average performance ratings

WG05 - WG08		Part 2 Trade/Less than Journeyman
	1	Continue required on-the-job and formal classroom training required in Civilian Training Plan
	2	Complete task qualifications for current position
	3	Complete task certifications for current position
	4	Master common to complex work tasks. Grade 8 instrument workers have a working knowledge of electrical, mechanical, hydraulic, and/or pneumatic principles; an understanding of the basic principles underlying electronics; and the skill to repair and maintain a variety of limited function electrical, electronic, mechanical, hydraulic, or pneumatic components and devices. They have skill to disassemble items and perform detailed visual examinations to detect worn or damaged parts such as broken wires, cracked insulation, worn gears, cracked solder joints, and defective contacts, pivots, springs, or similar deficiencies. They have skill to lubricate parts as required and remove dirt and corrosion with appropriate solvents. They have knowledge to determine when standard parts and components can be cleaned and reinstalled or must be replaced with new or reconditioned parts. Some work at this level requires skill in removing imperfections from seating or sealing surfaces with abrasives and by polishing surfaces. Grade 8 instrument workers have skill in soldering wire connections and components and repairing wiring assemblies. They have knowledge of how much heat delicate instruments and components can withstand before causing damage to internal parts. They have skill in using electrical test equipment such as ohmmeters, voltmeters, continuity testers, meggers, and test panels to test and adjust electrical quantities and perform final checks on repaired items in accordance with diagrams, instructions, and test procedures that detail the steps to be followed. They use a working knowledge of electronics to test items such as resistors, capacitors, transistors, potentiometers, diodes, relays, and transformers. Workers at this level have skill in using standard measuring devices such as micrometers, dial indicators, and feeler gauges to maintain accurate dimensions and close tolerances.
	5	Maintain successful to above average performance ratings

		Part 3 Journeyman
	1	Continue required on-the-job and formal classroom training required in Civilian Training Plan
	2	Complete task qualifications for current position
	3	Complete task certifications for current position
	4	Master common to complex work tasks. At Grade 10, instrument mechanics apply a thorough knowledge of electrical, mechanical, pneumatic, and/or hydraulic principles and theory and a working knowledge of electronic principles and theory to troubleshoot, repair, overhaul, modify, test, and calibrate instruments and equipment encompassing electrical, electronic, mechanical, hydraulic, and/or pneumatic subassemblies, components, and related devices such as transmitters, gyroscopes, accelerometers, indicators, servomechanisms, and amplifiers. They evaluate and may perform functional tests on items to determine the extent of repair required. They perform complete and partial teardowns of the instruments and clean parts and examine for wear, foreign matter, damage, and similar conditions. They check gears for backlash and alignment, and synchros and resolvers for accuracy and phasing. They replace bearings and bent or binding shafts and adjust slip rings. They repair and assemble pressure and fluid control valves, and perform electrical sensitivity adjustments. They apply a working knowledge of electronics including AC and DC, amplification, power supplying, transistors, semi-conductor theory, and servomechanism principles to test electronic circuitry and repair or replace items such as circuit cards, integrated chips, resistors, capacitors, transistors, diodes, relays, and transformers. Instrument mechanics at this level have skill in interpreting and applying the requirements in technical orders, manufacturers' handbooks and repair manuals, blueprints, schematics, shop procedures, maintenance check lists, engineering instructions, and similar documents while repairing, testing, and calibrating complex instruments and equipment. They have skill in the use of a microscope to check critical surfaces and dimensions; in tracing faulty wiring, components, or circuitry for hard-to-locate defects and problems; and in analyzing fault indications obtained during testing to determine the type and location of the malfunction and in accomplishing the necessary repairs. They have skill in the use of measurement devices such as vernier calipers, height gauges, comparators, and surface gauges to maintain and control such parameters as concentricity, spring loading, gear mesh, end play, run out, torque, and alignment. They also have skill in the use of test equipment such as manometers, oscilloscopes, and ampmeters to adjust, measure, and analyze such characteristics as pressure, flow, vacuum, wave forms, and power amplitudes.
	5	Master common to complex work tasks. Grade 11 instrument mechanics apply an extensive knowledge of electrical, mechanical, pneumatic, and/or hydraulic principles and theories, and a working knowledge of electronic principles, to repair, maintain, and calibrate the most complex instrument devices that perform differentiation, integration, and data translation functions. The devices serviced are characterized by interrelated systems and are designed to perform multiple functions so that troubleshooting is complicated by error indications from the interrelated assemblies. They have skill to isolate malfunctions in complex components and devices such as the gyro stabilized platform assembly in an aircraft inertial navigation unit (INU). They mount the INU on performance test fixtures and operate a test console to determine causes of malfunctions to one or a combination of defective components such as gyros, accelerometers, electronic modules, resolvers, or gimbal motors. They repair or replace defective components and perform final operational tests and calibration on the INU. They have skill to interpret complex drawings, sketches, wiring diagrams, manufacturers' plans, engineering blueprints, and similar technical information. They have skill to modify and improve methods of testing and overhauling new instruments and devices that may require adapting tools and test equipment to special uses such as extending the range or sensitivity of diagnostic equipment, or fabricating tools to accommodate particular needs, or to perform standard operations more efficiently. Instrument mechanics at this level must have a broad practical knowledge of construction and assembly techniques in order to make customized parts with complex configurations or assemble prototype devices with unusual angular relationships. They have skill in making precise repairs and alignments such as setting displacement outputs for mechanical ball-disc integrators or reworking spiral gears, differential gears, and antibacklashes. They have skill to align and calibrate special purpose test consoles that contain multifunctional items with critical mechanical and electronic tolerances and accuracies. They apply a comprehensive knowledge of testing and troubleshooting techniques and procedures to analyze, repair, and maintain electromechanical instrument systems where the equipment is interrelated and performs multiple functions or where performance specifications are met only by making simultaneous adjustments and alignments to interrelated system devices. At this level, instrument system malfunctions may result from the interaction of a number of defects in several locations rather than one clearly identifiable defect in a single location.
	6	Provide production support services
	7	Maintain successful to above average performance ratings

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OPM Classification Standards