

Apprentice Growth Plan – Control Technician

The following is an “outline” for the expectations of an apprentice who enters the company at the minimum level. The expectations listed are guidelines for training with milestones listed for each specific skill to be mastered.

Upon completion of each skill the specific trainer will be responsible for signing off that the apprentice has received the training for the specific skill. In addition, the department Service Manager will be required to test the apprentice and confirm the skill level has been met.

This “outline” is to be used as a basis for progressive skills training and though each skill has been designated to a particular year, it is in no way intended to limit the growth of an individual. If an apprentice can master more than the skills listed for the time period, the additional skills learned will have a weighted input into the overall rating of the apprentice level. The same can be said for an apprentice who does not meet the requirements for the time period listed.

All skills listed must be completed prior to moving to the next level. There will be no increases or changes made until every skill for the specific level has been completed and approved by the Service Manager.

Upon successful hiring

The Control Apprentice will be required to provide his/her own “tool pouch” containing the minimum hand tools required to do the work of a technician. See the attached list for tool pouch requirements.

Safety equipment – To be issued by the company.

MILESTONES

SIX MONTHS – The apprentice must be signed up for a basic electrical course through an outside school or college. This class will cover the basic fundamentals of electricity and motors. Tuition reimbursement will be made upon issuance of certificate of successful completion of the course.

Level 1 (up to completion of first year of service)

Skill required	Description	Trainer initials	Service Manager Initials
Completion of Basic electrical course	Fully completed course with grade of 75% or better		
Operations of multi-meter	Ability to use all aspects of meter, ohms, volts, AC/DC, amps		
Equipment identification	Ability to identify all equipment types, models, HW/Steam, LP/HP		
Use of manometer	Ability to use slack tube, incline and digital manometers, understand “w.c /PSI,”HG.		

Burner types	Ability to identify burner types, FD, premix, atmospheric		
Pilot set up	Ability to set up pilots, electrodes, air settings, gaps, transformers		
Programmer identification	Ability to determine what type of programmer, UV, IR, flame rod		
Magnetic starters	How they work, overload functions, settings, wiring, interlocks, coils start-stop, 3ph & 1 ph.		
Transformers	Operations, wiring, settings, usage, high and low voltage		
Flame sensing	How, flame rods, scanners, cells, MA and how circuitry works.		
Systems knowledge	Ability to understand the differences between HW and steam systems and how they work.		
Feed Tank – Deaerator	Knowledgeable in operations, applications and settings of Deaerators and feed systems.		
Feed pumps	Ability to troubleshoot, understand and install boiler feed water pumps.		

Level 2 (Completion of 2 years of service)

Pipe fitting	Identification of all pipe fittings and ratings, ability to cut and tread pipe, ability to use all pipe tools (wrenches, cutters).		
Basic relay logic	Ability to wire, troubleshoot and understand basic logic, warrick relays, control relays, alarm circuits, switches and stop-start circuits.		
Programmer operations	Understand sequences, differences, timings, wiring and settings of all typical programmers (Fireeye, Honeywell)		
Boiler level controls	Ability to repair, replace and troubleshoot all level controls, select applications and ratings including CBLM modulating level controls.		
Operational sequence	Full understanding of operational sequences of boilers, Firtube, HW, Atmospheric, Premix, light-off, pre-purge, post-purge		
Proof of closure, limits & interlocks	Full understanding of POC, limits and interlock circuitry. Ability to troubleshoot same.		
Gas flow	Ability to properly calculate gas flow being used by equipment, convert for pressure, temperature and altitude		
Combustion analyzer	Ability to use analyzer with full understanding of different parameters. Ability to calibrate same analyzer.		
Annual Maintenance	Ability to properly complete all sections of an Annual Maintenance form.		
Motors	Knowledge in motor rotation, amperage, safety factors, wiring and classes of motors		
Modulation	Understand R W B – 135 ohms circuitry –		

	demonstrate.		
Atmospheric boiler	Ability to completely start up an atmospheric boiler.		
Barometric dampers	Understand why, when and how to use, settings and effects		
Boiler controls	Ability to identify any component on a boiler and describe its operation or use		
Tubing and EMT	Ability to properly bend EMT and hard tubing		
Wire	Knowledge in selection and use of wire types and sizing.		
Combustion theory	Fully understand the three "T"s of theory and how they work.		

Level 3 (Completion of three years of service)

Ability to tune a 60 & 30 PPM burner	Perform complete set up or tune a 30 - 60 PPM burner using FGR or pre-mix.		
ClearFire or HTD	Ability to fully start up an atmospheric pre-mix, HTD boiler, ClearFire or forced pre-mix unit.		
Complex draft	Understanding of complex draft and control systems and their effects on combustion		
Complex relay logic	Ability to troubleshoot, install and understand complex logic systems (timers, relays)		
Programmmer and expansion modules and annunciators.	Ability to troubleshoot, install and understand operation, sequence and wiring of all basic programmmer and expansion modules.		
Electrical circuitry	Ability to troubleshoot any electrical circuitry issues.		
Milliamps	Understanding and ability to troubleshoot 4 -20mA circuits.		
Modulation motors	Ability to install troubleshoot and repair and modulation motors, 135 ohm, 4-20 MA, end switches		
Feed-water actuators	Ability to set-up, troubleshoot and calibrate feed-water actuators and CBK Valves		
Gas pressure regulators	Ability to verify sizing, conditions and pressures as well as flows and applications.		
Start up reports	Ability to fill out any and all SU reports.		
Programmer upgrades	Ability to perform basic programmer upgrades, Honeywell & Fireye.		
Linkage	Master linkage set ups, set travel, speed, angle and stroke of any set up.		
Electric boilers	Ability to troubleshoot, set up and commission		
ISA – On-line basic course	Completion of basic ISA course work		

Level 4 (Completion of 4 years of service)

Siemens Modulation Motor	Ability to troubleshoot, set up and replace Siemens modulation motors.		
SKP Actuators	Ability to troubleshoot, set up and replace an SKP type actuator (modulating, on-off)		
Burner Conversions	Ability to install, start up and commission C-B, IC and NatCom conversion burners.		
IC-NT, CB-NT (series)	Ability to start up, commission, troubleshoot and fully understand operations		
Linkage-less systems	Ability to start up, commission and troubleshoot Honeywell, Fireye, L&G linkage-less systems.		
Loop controls	Ability to install, troubleshoot and replace standard loop controls (UDC2500, Yokagawa)		
HAWK ICS	Program and commission a HAWK ICS system		
Perform complex controller upgrades	Ability to install and wire upgrades from a basic type control to a HAWK ICS control system.		
All burners	Ability to tune any burner.		

Level 5 (Completion of 5 years of service)

HAWK ICS	Ability to troubleshoot all aspects of the HAWK ICS system and interfaces.		
O2 trim systems	Ability to calibrate, commission and repair controls and heads of O2 trim systems.		
VFD systems	Ability to calibrate, commission and repair controls and components of VFD systems.		
Transmitters	Ability to calibrate, commission and repair all types of transmitters.		
3 element Feed water systems.	Ability to calibrate, commission and repair all types of 3 element feed water systems.		
Complex controls packages	Ability to calibrate, commission and repair all types of complex control systems.		
ISA – Certification	ISA Certification in control theory and operations. List of classes to be provided separately.		

The preceding outline is based upon a structured plan for apprenticeship growth. Each apprentice will be assigned to a senior technician who will be responsible for the development of the current phase of the program. In addition, the senior technician's performance evaluation will be based partially on the performance of the apprentice.

Safety – Safety issues have specifically been omitted from this outline because the employee will be required to conform to all safety policies regardless of level of performance.