

# INTEGRATED TOWER CONTROL SYSTEM

## ITC 9521 | SUBMITTAL

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Job: \_\_\_\_\_ Representative: \_\_\_\_\_  
 \_\_\_\_\_ Order no.: \_\_\_\_\_ Date: \_\_\_\_\_  
 Engineer: \_\_\_\_\_ Submitted by: \_\_\_\_\_ Date: \_\_\_\_\_  
 Contractor: \_\_\_\_\_ Approved by: \_\_\_\_\_ Date: \_\_\_\_\_

### CONFIGURATION

SYSTEM	OPERATION		QUANTITY	
Type of Towers**	<input type="checkbox"/> Open cooling tower(s) <input type="checkbox"/> Evaporative fluid cooler(s) with heat exchanger(s) with their circulator pump		<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5	
Design Envelope pumps***	<input type="checkbox"/> Single	<input type="checkbox"/> Parallel	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5	up to 5* duty + 0 Standby
		<input type="checkbox"/> Standby	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 + 1 Standby	up to 4* duty + 1 Standby
	<input type="checkbox"/> Tango <input type="checkbox"/> dualArm	<input type="checkbox"/> Parallel	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4	up to 4* duty + 0 Standby
		<input type="checkbox"/> Standby	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 + 1 Standby	up to 3* duty + 1 Standby

**NOTE:**  
 \*Rotating Assembly  
 \*\* Only headered and equal size towers are allowed. 1 speed signal/VFD is considered per tower  
 \*\*\* Only headered and equal size pumps are allowed.

### STANDARD FUNCTIONALITY AND CONSTRUCTION

The Armstrong ITC is a pre-programmed automation system for water based heat rejection / cooling systems. The scope of cooling plant automation includes :

- Cooling towers or fluid coolers and their fans;
- Multiple variable speed Design Envelope pumps installed in a headered configuration;
- Associated control valves, both isolation and by-pass valves;
- Automation of auxiliary heat rejection support systems such as water quality.

#### Standard construction

- 10.4" color back-lit touchscreen LCD panel (pc touchscreen)
- Internal circuit breaker protection (power supply requirement is 100-240 VAC/1 pH/50-60 Hz)
- NEMA 12 rated cabinet with secure front door via lock and key
- Operation temperature range: 0°C - 45°C (32°F - 113°F) (must not be exposed to direct sunlight)
- Operation humidity range: 5% - 95%, non-condensing

#### Standard functionality

- Remote or local start/stop mode of operation
- Three level password security

- Level 0 view only
- Level 1 operator view (for equipment operation and field adjustment)
- Level 2 installer view (for factory/commissioning)
- Manual or automatic control system (H-O-A selection)
- Color Touch screen operator interface with :
  - Active-element schematic displays with links to sub-menus for additional plant equipment information
  - Detailed view of the hydronic circuit indicating operating status
  - Capability to view and modify parameters and set points
  - Capability to override equipment
  - View all available live and historic data
- Serial communication Modbus RTU between ITC controller and VFD's tower fans and pumps
- Digital outputs for cooling tower 2-way automatic on/off isolation valves
- Control of Single, dualArm or Tango Design Envelope pumps
- Automatic pump sequencing and alternation
- Automatic sequencing and alternation of cooling towers
- Pump control: Parallel sensorless™ mode.
- Control of open or closed style cooling towers
- Enable auxiliary equipment through dry contact output for water treatment

**INPUT/OUTPUT**

A point schedule detailing analog and digital input and output point description, functions and types for the following:

**Digital inputs**

- Remote start (through an external system; ex. BAS)
- Emergency stop (Push button in the mechanical room)
- Alarm silencer (Button or through external system)
- Cooling tower inlet isolation valve open feedback
- Cooling tower inlet isolation valve close feedback
- Cooling tower outlet isolation valve open feedback
- Cooling tower outlet isolation valve close feedback
- Tower recirculation pump running (For evaporative fluid cooler applications only)
- Tower sump low level switch
- Tower sump high level switch

**Digital outputs**

- Cooling tower inlet isolation valve
- Cooling tower outlet isolation valve
- Enable tower recirculation pump (For evaporative fluid cooler applications only)
- Enable water treatment (can also be used with enable auxiliary equipment via interposing relay)
- Enable freeze protection equipment
- ITC system alarm (Signal for external system - ex. BAS)
- General audible alarm (Signal for external system - ex. Horn or Siren)
- Enable IPS4000 or P5PC Armstrong secondary loop controller (For secondary pumps enablement, where applicable)

**Analog inputs**

- Entering tower temperature (4-20 mA signal)
- Leaving tower temperature
- Outside air temperature
- Outdoor air humidity
- Distribution load bypass valve position feedback (0-10V DC signal)
- Tower bypass valve position feedback

**Analog outputs**

- Tower bypass valve position setpoint (0-10V DC signal)
- Distribution load bypass valve position setpoint (0-10V DC signal)

**ITC GENERAL CONTROL METHODS**

- Enables the cooling plant locally or based on a signal input (ex: BAS) and optionally on schedule or on outside air temperature signal (if a sensor is available).
- When the ITC is switched to manual operation mode (for commissioning), there is no automatic operation or sequencing of equipment. Operation of equipment can be manually set. When operation mode is switched back to auto, the automatic operation mode is restarted.
- Pump speed responds to load side demand with sensorless control within equipment upper and lower flow limits. Requires Design Envelope pumps.
- Pump speed responds to heat load requirement of the process application.
- Incorporates embedded logic to prevent hunting, pump flow surge, and motor overloading.
- Determines the most energy efficient combination of operation through Parallel Sensorless™ staging (requires Design Envelope pumps).
- Rotates the pumps based on a field adjustable interval of operating hours with a bump-less transfer algorithm.
- Locks out and places in alarm any VFD /pump unit that fails. In place of the failed assembly, the next available VFD/pump unit is operated. All alarms are auto-reset.
- Determines optimized fan speed based on load, within a field adjustable range, utilizing leaving and entering temperature sensors.
- Operates the most efficient quantity of towers to maximize the heat transfer surface area against incremental fan and pump power for minimum flow constraints.
- Starts auxiliary equipment via dry contact digital output for water treatment (UV biological or chemical treatment). Same dry contact signal shall be used to start basin sweepers, if applicable.
- Where applicable, monitors ambient temperature and enables freeze protection equipment when necessary.
- With fluid cooler tower types, enables the circulator pump of the operating fluid cooler.
- When necessary, opens the distribution load bypass valve to maintain the minimum flow required by the operating cooling towers.
- When necessary, opens the tower bypass valve to prevent low leaving temperature to be supplied to the distribution.
- System flow is obtained from design enveloped pumps Sensorless reading capability.

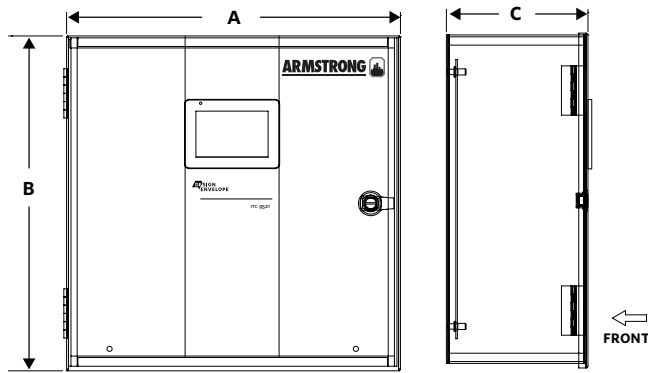
**OPTIONAL FEATURES AND DIMENSIONS**

**PANEL DIMENSIONS**

Dimensions

DIMENSIONS AND WEIGHT			
WIDTH	HEIGHT	DEPTH	WEIGHT
30.00 (762)	30.00 (762)	8.62 (219)	75 (35.0)

**Note:** Weights are approximate  
Dimensions in inches (mm) Weights in lbs (kg)



**OPTIONAL FEATURES**

Panel environmental rating

- NEMA:**  TYPE 12  
 TYPE 4X\*

**Note:** \* Recommended for outdoor application. Comprises of a stainless steel panel enclosure and a transparent non-metallic hinged inspection window protecting the screen.

**PANEL APPROVAL**

- UL (Standard)  
 CSA

**BAS COMMUNICATION**

- BAS communication:**  Not Required  Modbus RTU  
 Modbus TCP  BACnet™ MS/TP  
 BACnet™ IP

INSTRUMENTATION (FOR THE SYSTEM)	TOTAL QUANTITY	
<input type="checkbox"/> Tower Supply & Return Temperature Sensors	_____	2
<input type="checkbox"/> Outside Air Temperature & Humidity Sensor	_____	1

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