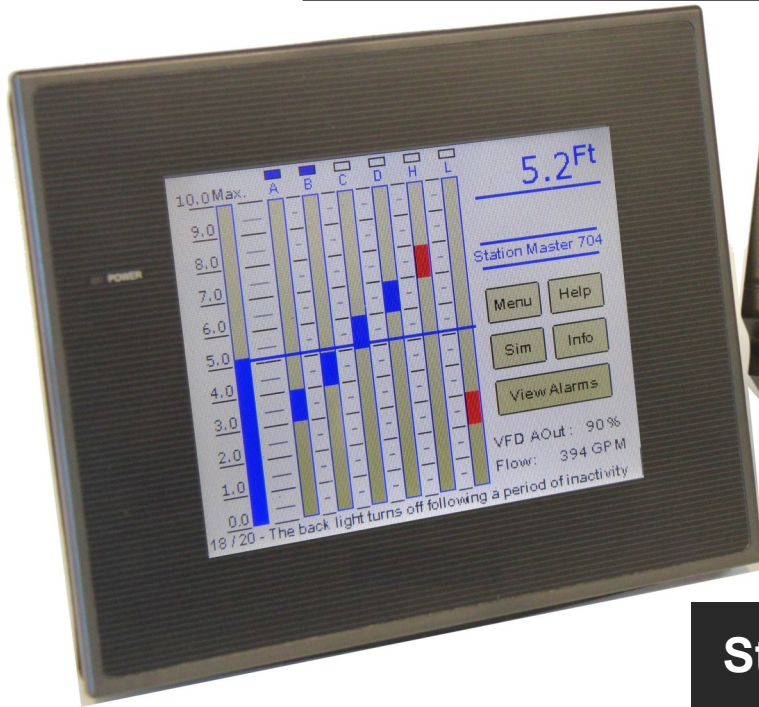


QUADRUPLEX PUMP CONTROLLER



Station Master™ 704

TouchPoint™ Intuitive Pump Control

The Station Master 704 provides quadruplex pump control with an intuitive, easy-to-use graphical user interface.

The HMI provides a graphical representation of the process. The left-most column represents the process level. Subsequent columns represent Pump and Alarm On/Off setpoints. Underlying screens allow the operator to adjust setpoints, select alternation sequences and configure the controller for the specific application.

The DIN-rail-mounted IO Module is typically mounted on the enclosure's inner panel. The module's relay outputs provide control for the four pumps and two selectable alarm points. The module's inputs are user selectable and include: pump running, pump failed, control inhibit and external alarm acknowledge. The primary and secondary (optional) process sensors and a flow sensor (optional) connect to three of the module's 12-bit analog inputs. The SM704VF provides VFD control via by one of the I/O module's analog outputs. The second analog output provides a 4-20 mA DC output that follows the process level over a 0-100% excursion.

Contegra's STATION MASTER 704 controller is an Easy-to-See and Easy-to-Set (EZ2 See/EZ2 Set™) automatic duplex pump control and alarm monitoring system.

The STATION MASTER 704 controller is ideal for sewage lift stations, water systems, or other process control applications. The EZ2 See/EZ2 Set™ interface makes installation and operation a simple process. The graphical display shows the current tank level, Pump 1-4 On/Off

Features:

- NEMA 4X, QVGA (Quarter VGA), Color Touch-Screen, TouchPoint™ graphical interface
- DIN Mtd Input/Output Module with pluggable terminal blocks
- Process Simulation
- Multi-Level Security Protection
- Alternation: FOFO, LOLO (Rotary), Fixed
- Running Time Meters, Start Counters, Cycle Timers
- Primary and Secondary Analog Inputs
- Flow Sensor Input & Graphing
- User-Configurable Scale

setpoints, and the High and Low alarm setpoints.

All adjustments, including controller configuration, pump on/off settings, and alarm setpoints are easily accessed via either the main screen's columnar display or via the main screen's MENU pushbutton.

EZ2 SEE DISPLAY

The LED backlit HMI provides daylight viewable indication of the current tank level, pump on/off setpoints, and high and low alarm setpoints, along with easily accessible controller setup

Station Master™ 704C / 704V

information (e.g. alternator sequence, pumping direction, etc.)

EZ2 SET ADJUSTMENTS

The TouchPoint™ operator interface leads the operator through the setpoint and configuration selections. The features include setpoint adjustment, convenient selection of the pumping order, pumping direction (i.e. Pump Up/Pump Down), and numerous other easily understood and readily accessible features. This "guided tour" of the controller's features makes operating the controller as easy as touching the desired setpoint or adjustment and changing the respective setpoint.

With the STATION MASTER controller's sealed front cover there are no programming switches to move or jumpers to lose. The interface makes setup, adjustment and confirmation of the controller's operating parameters EZ2 See/EZ2 Set™.

The controller accepts analog inputs ranging from 4-20 mADC or 0-5 VDC. The Station Master 704 controller is able to easily scale either a calibrated (i.e. 4-20 mADC over 0-10' excursion) or an uncalibrated input.

A Feature Packed System

Whether dealing with a new installation or retrofitting an existing site, the Station Mater 704 controller provides outstanding control and alarm capabilities.

The TouchPoint™ interface allows the operator to easily select 1st On/ 1st Off, Fixed, or Rotary alternation.

All adjustments and setpoints are stored in permanent memory.

The installing technician sets the controller's operating range to a value up to a 100.0' excursion.

The Station Master 704 has an on-board audible alarm and two selectable alarm outputs. The operator may select a number of available alarm conditions to activate the alarm output(s).

Manual level simulation allows the operator to test the controller's operation and confirm the configuration. Pressing the SIM button activates level simulation. Simulation "safety" is an integral part of the Station Master's control strategy.

To prevent unauthorized changes to the system's settings, the HMI's setpoints and configuration adjustments are protected by multiple security levels.

The SM704C may be used in either Pump-Up or Pump-Down applications. The SM704V is used in Pump-Down applications.

The Station Master 704's inputs may be configured as either sinking (i.e. Pull down) or sourcing (i.e. Pull-Up).

I/O features:

- Analog input: 4-20 mA or 0-5 VDC input. The IO module provides 24 VDC for sensor excitation.
- Selectable inputs: Pump Running, Failed, Unavailable, Flow pulse (w/totalization), alarm acknowledge and controller inhibit.
- Discrete Relay Outputs: Pump 1-4 Control and two selectable alarm outputs. All relay outputs are normally open (i.e. open on power failure). Outputs 1-4 share a common return. Outputs 5 & 6 share a second common return. The relays are rated for 2 amps maximum per contact and a maximum of 5 amps per common.

Installation

Externally the HMI is 5.7"H x 7.25"W x 1.7"D . The required door cutout is 5.2"H x 6.78"W".

The IO module is 4" H X 6"W X 3.25"D. All wiring is terminated at removable terminal blocks.

The SM704 includes the serial communication cable that provides communication between the HMI and the IO Module.

Power: HMI— 24 VDC, IO Module — 120 VAC.

Ordering Information:

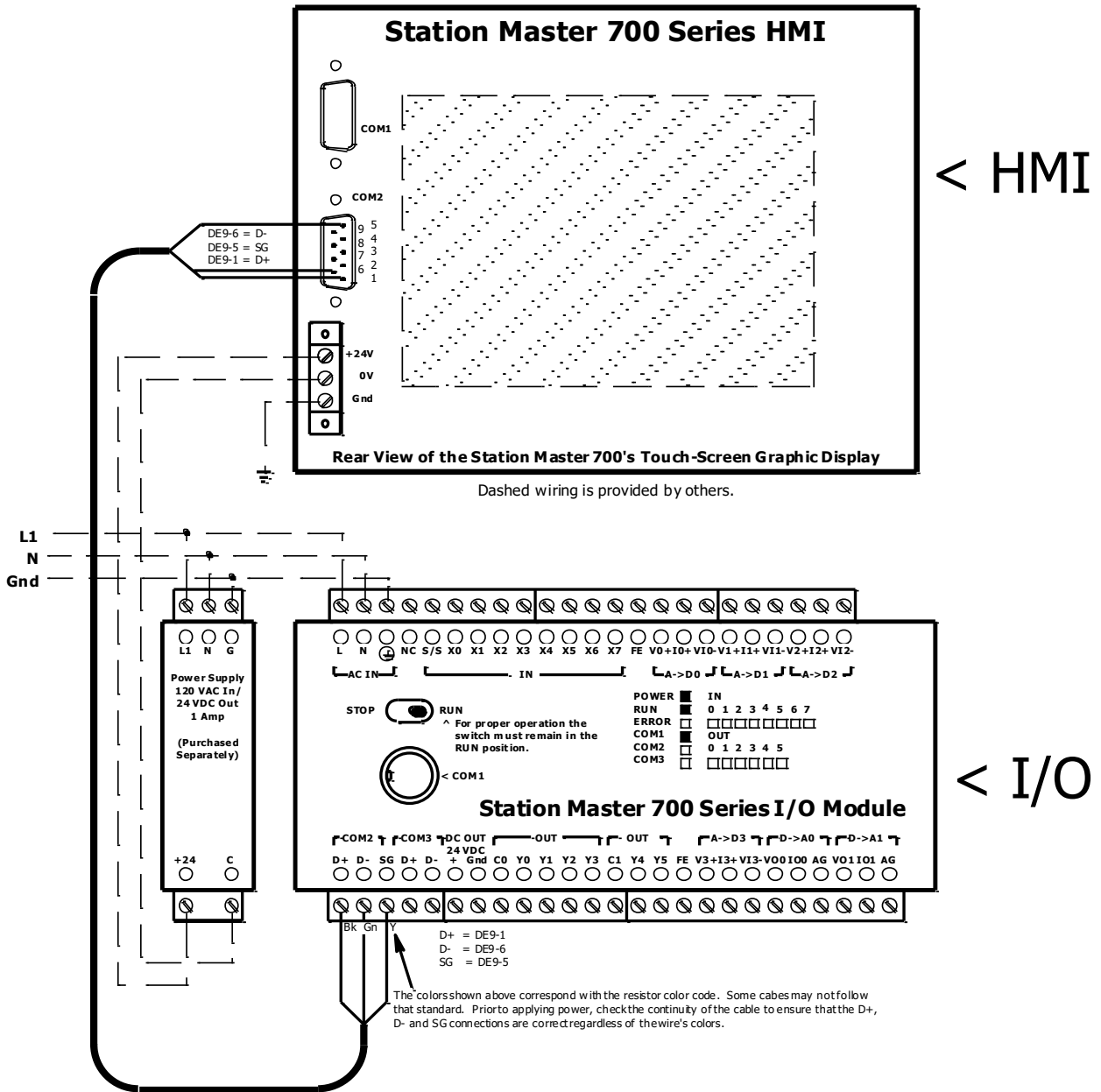
SM704C

Quadruplex Controller for Pump-Up or Pump-Down, constant speed applications

SM704V

Quadruplex Controller for Pump-Down, variable speed applications

Station Master™ 704C / 704V



The 120 VAC -> 24 VDC power supply is provided by others.

Station Master™ 704C / 704V

Engineering Specifications

This specification covers a complete and operational automatic duplex pump control and alarm system responding to the _____ level as shown on the plan drawings.

For ease of installation, the controller shall be comprised of two discrete and separate components: 1) a door-mounted HMI and 2) a panel-mounted Input Output Module. [Controllers comprised of a single door-mounted unit require excessive wiring to the door. Such controllers are not responsive to the specification. As such, they are precluded by the specification.] The controller shall provide easy, convenient indication and adjustment of the operating setpoints via the touch-screen interface without the need for tools. For ease of operation and configuration, multiple indicating columns are required. [Controllers that provide fewer columns, thus limiting the viewing of relevant and necessary station information, are specifically precluded by this specification.]

To reduce exposure to corrosive environments and ensure the control system's reliable, long-term operation, the controller shall have a sealed, user-friendly, graphical interface. The HMI shall be a NEMA 4X rated, QVGA touch-screen display that is capable of producing 65,000 colors. The HMI shall maintain communications with the IO module via serial communications cable. The IO module shall maintain control station operation in the event of communication failure with the HMI. The HMI shall be powered by a 24 VDC supply. The DIN-Rail mounted Input/Output Module shall be powered by a protected 120 VAC power source. The IO module shall provide 24 VDC for sensor excitation and for activation of the IO module's eight discrete inputs. The IO module's discrete inputs shall be, as a group, configurable as sinking or sourcing inputs. The IO module shall contain four analog inputs and two analog outputs. Two of the four Analog Inputs shall be dedicated to the Primary and Secondary (i.e. redundant) level-sensing transducer inputs. A third analog input shall be available for the flow sensing transducer. The analog inputs shall be field selectable for use with voltage or mA/DC inputs. One of the two analog outputs shall be used to command the speed of the associated VFDs (Variable Frequency Drives—Pump-Down operation) as required and as described elsewhere in the specification. Provided with the VFD controlling analog output shall be multiple sets of attributes that provide precise speed control of the associated VFD for each of the operating stages. The controller shall allow the operator to scale the analog inputs to the meet the application's requirement. The analog outputs shall be field selectable as a VDC or mA/DC output. The IO module's base unit shall contain six relay outputs aggregated into two groups. The IO module shall contain three communication channels. One channel shall be exclusively dedicated for use and intercommunication with the supplied HMI.

The controller shall accept a primary and secondary analog input signal responding to level fluctuations in the monitored process level. The displayed process level shall be field adjustable over a user specified range with a maximum upper bound of 100.0 feet. The controller shall allow the user to select the controlling analog input (primary or secondary). The controller's display range shall be adjustable as a portion of the sensor's full scale range. The HMI's primary display shall contain an easily understood and clearly defined graphic representation of the process input's present level and all adjustments associated with the Pump Control (i.e. On/Off) stages and High or Low-Level alarms. The process level shall be represented by a bargraph. The maximum height of the bargraph shall be representative of the user specified display range. Bargraphs shall also display the Pump On and Off setpoints. Each pump control group (i.e. group of "On/Off" setpoints) shall be represented by a single bargraph. [Displays that require one bargraph for the pump On setpoint and a separate yet associated bargraph for the Pump Off setpoint are unacceptable and are specifically precluded by this specification.] The single column bargraph shall contain both a low and high setpoint. Such points shall define a control band. The bargraph shall clearly display the control bands associated with each of the control stages. The controller's configuration and frequently-used setpoints shall be easily accessed via 'hot-spots' and 'soft-pushbuttons' which are an integral part of the displays structure. Touching a 'hot-spot' associated with the lower or higher portion of a bargraph shall cause the controller to display all setpoints associated with the bargraphs. Touching the 'hot-spot' associated with the center of a specific column causes the controller to display the setpoints and attributes that are associated with the respective stage control.

The primary display shall also contain a set of 'soft-pushbuttons' that allow the operator review all aspects of the controller's configuration and status. Soft-buttons shall consist of but shall not be limited to the following selections: Menu, Help, SIM, Info and ACK/View Alarms. Pressing the MENU soft-button shall produce a textual menu that allows the operator to review and adjust the controller's myriad attributes. Pressing Info shall cause a Status Screen to appear. The Status Screen shall provide a display of the control system's present state including but not be limited to: pump called, pump running, pump fault, alternation mode, alternation sequence and the pumping direction. The full breadth of the Status Display's functionality shall be made available by enabling the desired features associated with the discrete inputs.

The controller shall contain Running Timer Meters, Cycle Timers, Start Counters and No-Flow Timers for each of the pumps. Such features are enabled by proper configuration of the controller's inputs. Four of the controller's outputs shall be reserved for pump control. The customer may select the specific functions that are to be assigned to each of the remaining two available outputs. The list shall include but shall not be limited to High Alarm, Low Alarm, Input Signal High Failure (i.e. Over Range), Input Signal Low Failure (i.e. Under Range) and Pump Fault.

The controller shall contain an internal annunciator that activates on an alarm condition. The controller shall contain an integral 'silence' key and allow for a selectable input for an external alarm acknowledge/ silence. An alarm indicator and ACK (i.e. acknowledge) soft-button shall appear on the controller's displays. Alarms shall be logged into the controller's historical alarm buffer. The alarm buffer shall show the time and date of each status change for any alarm condition. The pump control circuits shall be forced OFF by activation of the external inhibit input. Upon power restoration, or removal of the inhibit input, the controller shall enable its outputs in an adjustable time-step sequence as required to meet the demand.

The controller shall continuously indicate the status of the selected alternation sequence, pumping direction, and control modes via the Info soft-pushbutton and Status Display. The controller shall provide 1st On/1st Off, Fixed, and Auto Rotate alternation sequences and selectable Pump-Up or Pump-Down programming. Integral span, offset, and damping adjustments shall be easily adjustable. The controller shall have a configurable security lockout feature that may be used to prohibit setpoint adjustment by unauthorized personnel.

The controller shall contain a level simulation function that allows manual manipulation of the displayed process variable. While simulating, the controller shall display both the actual process level and the simulated level.

It is the specific intention of this functional requirement that a standard controller shall be provided with features as described herein. Furnishing of similar functions using multiple setpoint modules or extensive relay/timer logic to accomplish control sequences, etc., is specifically precluded by this specification and is not acceptable. The controller shall be a (*choose* ▶) Contegra Station Master 704C (constant speed) *or* ... Station Master™ 704V (variable speed) .

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