

# TRIPLEX PUMP CONTROLLER



## Station Master™ 703

### TouchPoint™ Intuitive Pump Control

Contegra's STATION MASTER 703 controller is an Easy-to-See and Easy-to-Set (E22 See/E22 Set™) automatic triplex pump control and alarm monitoring system that provides triplex pump control with an intuitive, easy-to-use graphical user interface.

The STATION MASTER 703 controller is ideal for sewage lift stations (i.e. Pump-Down applications) or water systems (i.e. Pump-Up applications). The E22 See/E22 Set™ interface makes installation and operation a simple process. The graphical display shows the current tank level, pump 1, 2 and 3 on/off setpoints, and the high and low alarm setpoints.

Underlying screens allow the operator to adjust the pump and alarm setpoints, select alternation sequences review alarms and configure the controller for the specific application. The adjustments are easily accessed through the HOME screen's columnar display or by means of the HOME screen's MENU pushbutton.

The DIN-rail-mounted IO Module is typically mounted on an enclosure's inner panel. The module's relay outputs provide control for the three equally-sized pumps and several selectable alarm points. The module's selectable inputs include pump running, pump unavailable, pump no-flow, control inhibit, external alarm acknowledge, pump over-temperature, pump seal-failure, generator running, and alarm acknowledge. The IO Module's 12-bit analog inputs accept both a primary and secondary (optional) process level sensing input and an analog signal for a flow sensor (optional). In pump-down applications the SM703V provides VFD control by means of

### 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, Rotary, Fixed
- Running Time Meters, Start Counters, Cycle Timers
- Primary and Secondary Analog Inputs
- User-Configurable Scale

an analog outputs which is used to modulate the VFD's speed. The controller's second analog output follows the process level over a 0-100% excursion.

### E22 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 information (e.g. alternator sequence, pumping direction, etc.)

### E22 SET ADJUSTMENTS

# Station Master™ 703C / 703V

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 703 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 703 controller provides outstanding control and alarm capabilities.

The TouchPoint™ interface allows the operator to easily select 1<sup>st</sup> On/ 1<sup>st</sup> 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 703 has an on-board audible. Several user-selectable alarm outputs are also provided.

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 SM703C may be used in either a Pump-Up or Pump-Down application. The SM703V is for use in Pump-Down applications.

The Station Master 703'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 Discrete Inputs: Pump 1, 2 or 3 Running, Pump 1, 2 or 3 Failed, external alarm acknowledge and controller inhibit.
- Discrete Relay Outputs: Pump 1, 2 and 3 Control and 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 SM703 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:

SM703C

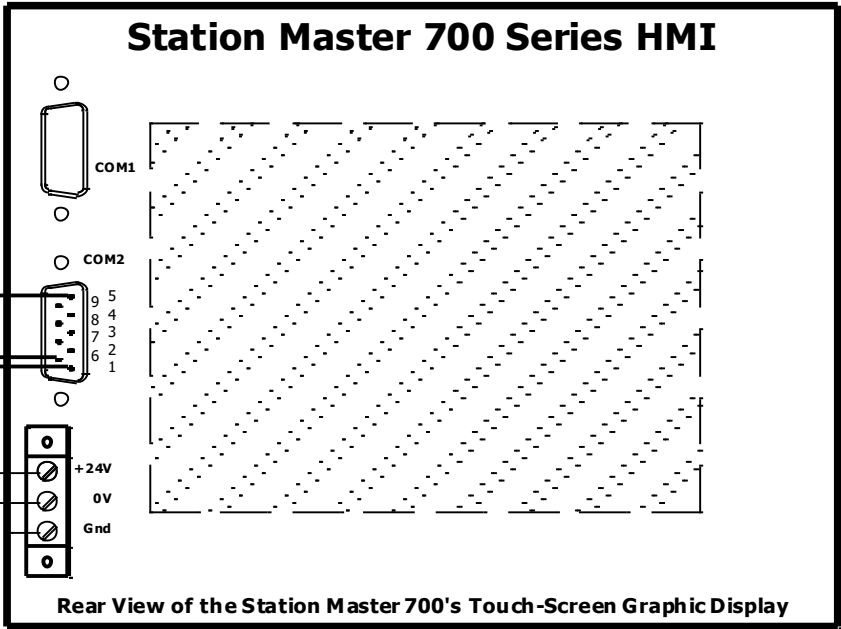
Triplex Controller for Pump-Up or Pump-Down, constant speed applications

SM703V

Triplex Controller for Pump-Down, variable speed applications.

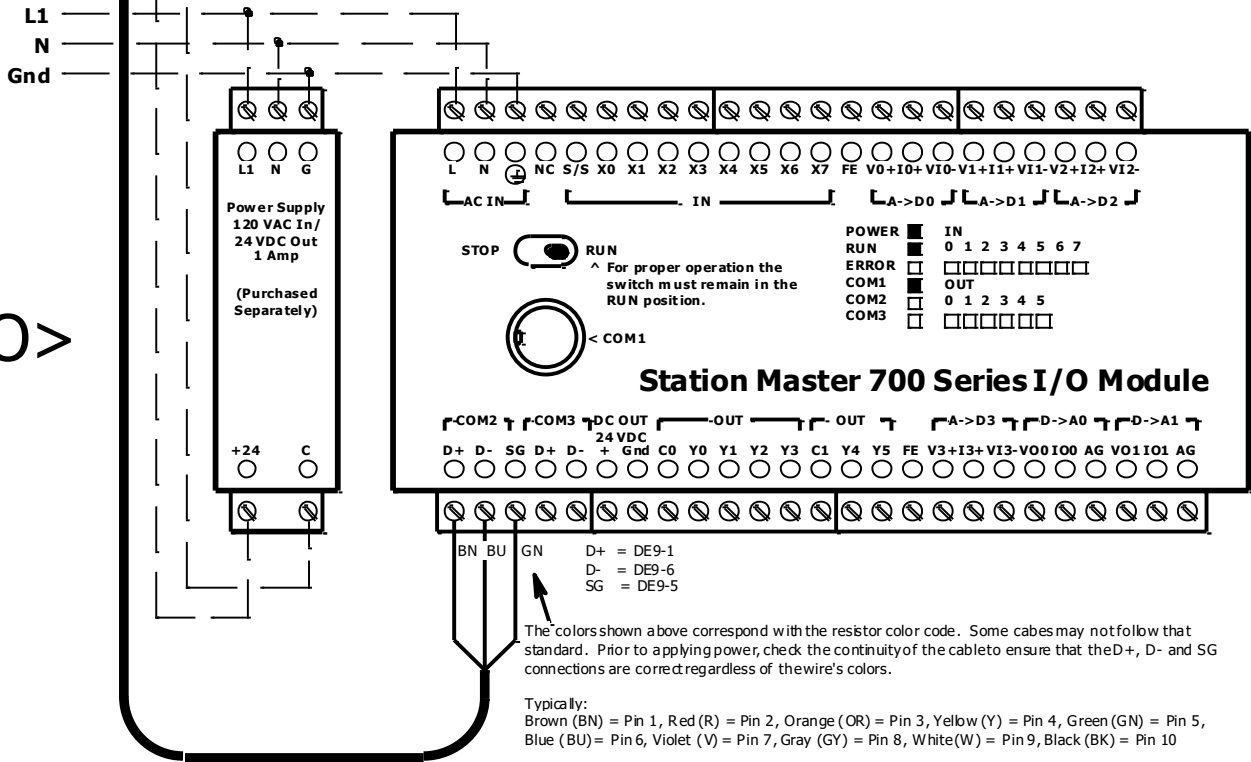
# Station Master™ 703C / 703V

HMI >



Dashed wiring is provided by others.

I/O >



The colors shown above correspond with the resistor color code. Some cables may not follow that standard. Prior to applying power, check the continuity of the cable to ensure that the D+, D- and SG connections are correct regardless of the wire's colors.

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

# Station Master™ 703C / 703V

## Engineering Specifications

This specification covers a complete and operational automatic triplex 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 a manufacturer-provided 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 a flow sensing transducer. The analog inputs shall be field selectable for use with voltage or mADC inputs. One of the two analog outputs shall be used to command the speed of the associated VFDs (Variable Frequency Drives) when used in a Pump-Down mode and 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 Pump-Down 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 mADC output. The IO module's base unit shall contain six relay outputs aggregated into two groups. The IO module shall contain a communication channel which 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 a pump On setpoint and a separate yet associated bargraph for a 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. Three of the controller's outputs shall be reserved for control of the three equally-sized pumps. The controller shall provide the ability for the customer to select the specific functions that are to be assigned to each of the remaining 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 a dedicated input for an external alarm acknowledge/ silence. An alarm indicator and ACK (i.e. acknowledge) soft-button shall appear on each of 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 703C (constant speed) *or* ... Station Master™ 703V (variable speed) .

TouchPoint™ is a trademark of Contegra Inc.

Contegra Inc.  
14033 Commerce Ave NE  
Suite 300-405  
Prior Lake, MN 55372

Phone: 651-905-0900  
FAX: 651-454-4665  
www.Contegra.com