

SECTION B

RELAY OUTPUTS

Revision Date: 12-30-22

DESCRIPTION OF OPERATION

Introduction

Relay Outputs ROX1 - ROX12 are provided to perform a variety of Control or Alarm Functions that may be assigned to them by the operator.

The Relay Outputs have Dry Contacts that are rated for 8A @ 120VAC Resistive.

For Terminal Block numbers see page B-4.

Remote Control

Relay Outputs that are assigned the Function of "Remote Control" (Function 0) may be controlled remotely by SCADA.

Also, the "RELAY OUTPUT SETUP & STATUS" screens on the SC5000-CTS-HMI have "REMOTE CONTROL" push-buttons that allow the operator to manually control any of the Relay Outputs set for "Remote Control" (Function 0).

See the description of "Remote Control" (Function 0) below.

Relay Testing

To test a Relay Output and the connected Control Panel features temporarily assign the Function of the relay to "Remote Control" (Function 0), perform the testing and then set it back to the correct Function for the application. There is a "REMOTE CONTROL" push-button on the SC5000-CTS-HMI for each Relay Output.

Status

The Status of the Relay Outputs may be read from Modbus Coils 49 - 60 (Register 40004 Bits 0 - 11).

When a Relay Output's contacts are closed the respective Modbus Coil or Bit will show a "1".

When a Relay Output's contacts are open the respective Modbus Coil or Bit will show a "0".

For Relay Output Status on the SC5000-CTS-HMI see HMI screens on pages B-5 & B-6.

For Relay Output Status on the SC5000-LED-HMI see Parameters ro.01 - ro.12 on page X-20.

Functions

Many of the Relay Outputs are assigned default Functions from the factory, but they may be changed by the operator using Parameters F.201 - F.212.

See page B-3 and see "RELAY OUTPUT FUNCTIONS" below for a description of each of the Functions.

RELAY OUTPUT FUNCTIONS

Remote Control - Function 0

Relay Outputs that are assigned the Function of "Remote Control" (Function 0) may be controlled remotely by writing to Modbus Coils 65 - 76 (Register 40005 Bits 0 - 11).

When the respective Modbus Coil or Bit is set to "1" the Relay Output contacts close.

When the respective Modbus Coil or Bit is cleared to "0" the Relay Output contacts open.

Upon loss of communication with the SCADA system the Relay Output Control Commands will be canceled, after a delay. See the "Remote Control Command Canceling Delay" (Parameters E.011 - E.013) on page E-2.

Pump 1 (2, 3, 4, 5, 6) Control - Functions 1 - 6

Relay Outputs assigned the Function of "Pump 1 (2, 3, 4, 5, 6) Control" (Functions 1 - 6) provides contacts to turn on and off the pumps.

Low Level Alarm - Function 7

A Relay Output assigned the Function of "Low Level Alarm" (Function 7) provides contacts that closes upon a Low Level Alarm condition.

RELAY OUTPUT FUNCTIONS

High Level Alarm - Function 8

A Relay Output assigned the Function of “High Level Alarm” (Function 8) provides contacts that closes upon a High Level Alarm condition.

Low Flow Rate Alarm - Function 9

A Relay Output assigned the Function of “Low Flow Rate Alarm” (Function 9) provides contacts that closes upon a Low Flow Rate Alarm condition.

High Flow Rate Alarm - Function 10

A Relay Output assigned the Function of “High Flow Rate Alarm” (Function 10) provides contacts that closes upon a High Flow Rate Alarm condition.

Low Supply Pressure Alarm - Function 11

A Relay Output assigned the Function of “Low Supply Pressure Alarm” (Function 11) provides contacts that closes upon a Low Supply Pressure Alarm condition.

High Supply Pressure Alarm - Function 12

A Relay Output assigned the Function of “High Supply Pressure Alarm” (Function 12) provides contacts that closes upon a High Supply Pressure Alarm condition.

Low Discharge Pressure Alarm - Function 13

A Relay Output assigned the Function of “Low Discharge Pressure Alarm” (Function 13) provides contacts that closes upon a Low Discharge Pressure Alarm condition.

High Discharge Pressure Alarm - Function 14

A Relay Output assigned the Function of “High Discharge Pressure Alarm” (Function 14) provides contacts that closes upon a High Discharge Pressure Alarm condition.

RELAY OUTPUT SETUP

| User / Operator Info. | | SCADA | | Register Address | Description of Parameters and SCADA Notes |
|---------------------------|---------------|---------------|-------|----------------------|--|
| Parameter | Default Value | Current Value | | | |
| Relay Output Setup | | | | | |
| Setup | | | | Relay Output | Function of Relay Output: 0 = Remote Control 1 = Pump 1 Control 2 = Pump 2 Control 3 = Pump 3 Control 4 = Pump 4 Control 5 = Pump 5 Control 6 = Pump 6 Control 7 = Low Level Alarm 8 = High Level Alarm 9 = Low Flow Rate Alarm 10 = High Flow Rate Alarm 11 = Low Supply Pressure Alarm 12 = High Supply Pressure Alarm 13 = Low Discharge Pressure Alarm 14 = High Discharge Pressure Alarm Notes: 1. Output Relays set for Function 0 may be Remotely Controlled by writing to Modbus Coils 65 - 76 (Register 40005 Bits 0 - 11). 2. Output Relay's status may be read from Modbus Coils Modbus Coils 49 - 60 (Register 40004 Bits 0 - 11). |
| F.201 | 1 | | 40651 | Relay Output - ROX1 | |
| F.202 | 2 | | 40652 | Relay Output - ROX2 | |
| F.203 | 3 | | 40653 | Relay Output - ROX3 | |
| F.204 | 4 | | 40654 | Relay Output - ROX4 | |
| F.205 | 5 | | 40655 | Relay Output - ROX5 | |
| F.206 | 6 | | 40656 | Relay Output - ROX6 | |
| F.207 | 7 | | 40657 | Relay Output - ROX7 | |
| F.208 | 8 | | 40658 | Relay Output - ROX8 | |
| F.209 | 0 | | 40659 | Relay Output - ROX9 | |
| F.210 | 0 | | 40660 | Relay Output - ROX10 | |
| F.211 | 0 | | 40661 | Relay Output - ROX11 | |
| F.212 | 0 | | 40662 | Relay Output - ROX12 | |

RELAY OUTPUT STATUS & REMOTE CONTROL

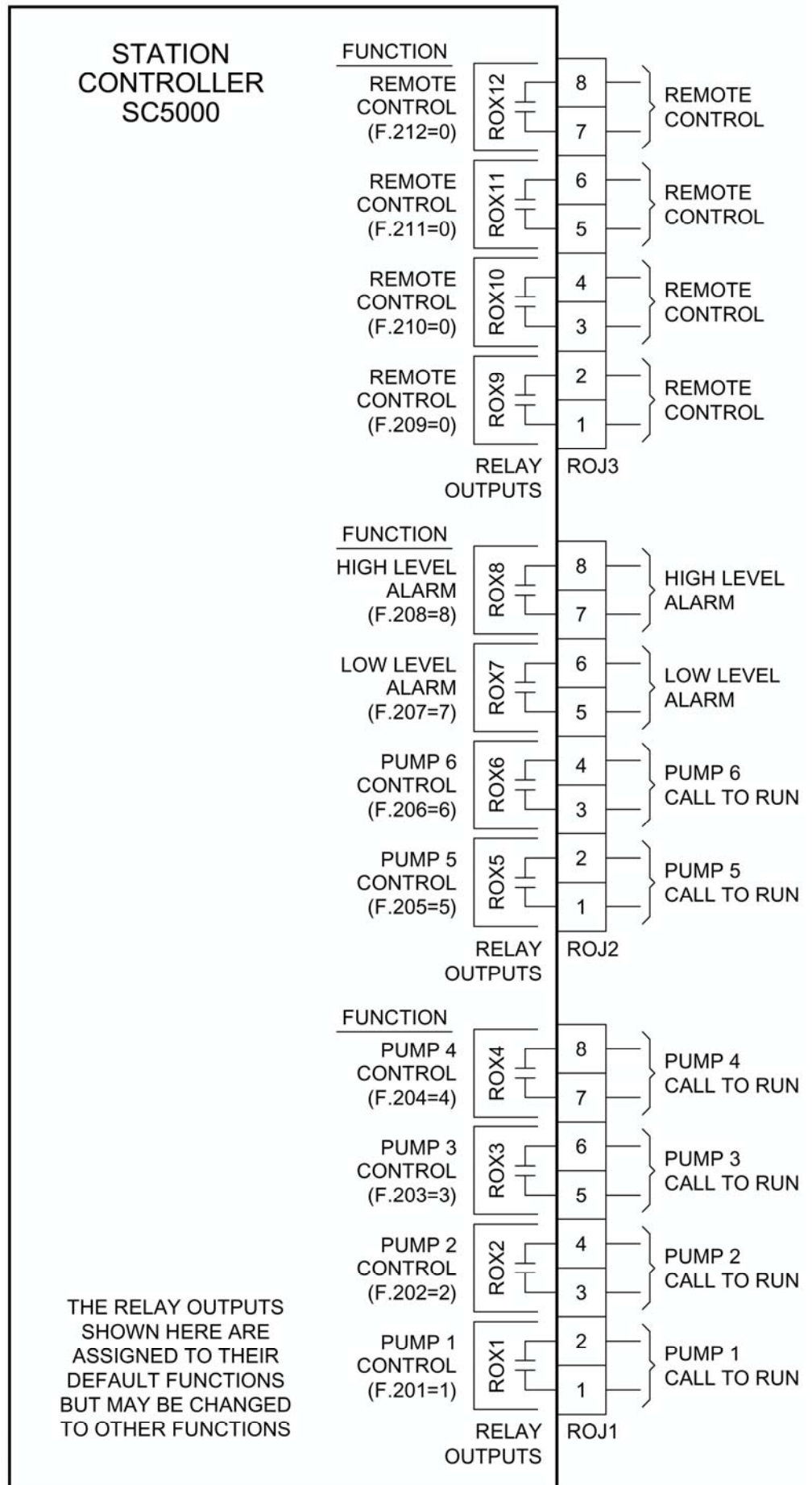
| SCADA Register Address | Description of Register Contents (Where a Modbus Coils are represented by a Bit in a Register) | | | | | | | | | | | | | | | | |
|------------------------|---|-------|-------|-------|-----------------------------|-----------------------------|-----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|------|
| 40004 | 64 | 63 | 62 | 61 | 60 | 59 | 58 | 57 | 56 | 55 | 54 | 53 | 52 | 51 | 50 | 49 | Coil |
| | Spare | Spare | Spare | Spare | ROX 12 Relay Status | ROX 11 Relay Status | ROX 10 Relay Status | ROX 9 Relay Status | ROX 8 Relay Status | ROX 7 Relay Status | ROX 6 Relay Status | ROX 5 Relay Status | ROX 4 Relay Status | ROX 3 Relay Status | ROX 2 Relay Status | ROX 1 Relay Status | |
| | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | Bit |
| 40005 | 80 | 79 | 78 | 77 | 76 | 75 | 74 | 73 | 72 | 71 | 70 | 69 | 68 | 67 | 66 | 65 | Coil |
| | Spare | Spare | Spare | Spare | ROX 12 Relay Remote Control | ROX 11 Relay Remote Control | ROX 10 Relay Remote Control | ROX 9 Relay Remote Control | ROX 8 Relay Remote Control | ROX 7 Relay Remote Control | ROX 6 Relay Remote Control | ROX 5 Relay Remote Control | ROX 4 Relay Remote Control | ROX 3 Relay Remote Control | ROX 2 Relay Remote Control | ROX 1 Relay Remote Control | |
| | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | Bit |

For Relay Output Status on the SC5000-CTS-HMI see HMI screens on pages B-5 & B-6.

For Relay Output Status on the SC5000-LED-HMI see Parameters ro.01 - ro.12 on page X-20.

RELAY OUTPUTS

Connection Diagram



RELAY OUTPUTS - Touchscreen HMI SCREENS

RELAY OUTPUT SETUP & STATUS

[Previous Screen](#)

| RELAY OUTPUT | SETUP | RELAY STATUS | REMOTE CONTROL |
|--|-------|--------------|----------------|
| ROX1 – F.201 – | 12 | OFF | FORCE ON |
| ROX2 – F.202 – | 12 | OFF | FORCE ON |
| ROX3 – F.203 – | 12 | OFF | FORCE ON |
| ROX4 – F.204 – <small>Parameter</small> | 12 | OFF | FORCE ON |

DISCRETE I/O BOARD 1

12345

Operating Program Rev. Number
Parameter: d.108

12345

Polling Counter
Parameter: d.109

RELAY TEST MODE

12

0 = Off
1 = On
Parameter: F.200

"On" Allows Remote Control of All Relays.

[Next Screen](#)

For Remote Control of Relay set Setup Function to "0". RELAY TEST MODE ON

RELAY OUTPUT SETUP & STATUS

[Previous Screen](#)

| RELAY OUTPUT | SETUP | RELAY STATUS | REMOTE CONTROL |
|--|-------|--------------|----------------|
| ROX5 – F.205 – | 12 | OFF | FORCE ON |
| ROX6 – F.206 – | 12 | OFF | FORCE ON |
| ROX7 – F.207 – | 12 | OFF | FORCE ON |
| ROX8 – F.208 – <small>Parameter</small> | 12 | OFF | FORCE ON |

DISCRETE I/O BOARD 2

12345

Operating Program Rev. Number
Parameter: d.110

12345

Polling Counter
Parameter: d.111

RELAY TEST MODE

12

0 = Off
1 = On
Parameter: F.200

"On" Allows Remote Control of All Relays.

[Next Screen](#)

For Remote Control of Relay set Setup Function to "0". RELAY TEST MODE ON

RELAY OUTPUTS - Touchscreen HMI SCREENS

Previous Screen

| RELAY OUTPUT | SETUP | RELAY STATUS | REMOTE CONTROL |
|----------------------------|-------|--------------|----------------|
| ROX9 – F.209 | 12 | OFF | FORCE ON |
| ROX10 – F.210 | 12 | OFF | FORCE ON |
| ROX11 – F.211 | 12 | OFF | FORCE ON |
| ROX12 – F.212 Parameter | 12 | OFF | FORCE ON |

DISCRETE I/O BOARD 3

12345

 Operating Program Rev. Number
Parameter: d.112

12345

 Polling Counter
Parameter: d.113

RELAY TEST MODE

12

 0 = Off
 1 = On
Parameter: F.200

"On" Allows Remote Control of All Relays.

For Remote Control of Relay set Setup Function to "0".

RELAY TEST MODE ON