

Allen-Bradley Bulletin 900 Driver Help

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Allen-Bradley Bulletin 900 Driver Help

Help version 1.024

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Overview

The Allen-Bradley Bulletin 900 driver provides an easy and reliable way to connect Allen-Bradley Bulletin 900 devices to OPC Client applications, including HMI, SCADA, Historian, MES, ERP and countless custom applications.

Driver Setup

Channel Properties

A channel represents a serial line connected to one of the computer's COM ports or an Ethernet network connected to the computer's default Network Interface Card (NIC). The Channel Properties allow users to specify the connection type and other properties that will be shared by devices on that network.

Device Properties

Each physical device to be polled must be represented by a device object in the server. For information on the Allen-Bradley Bulletin 900's device-specific dialog, refer to [Process Value Scaling](#).

Device Setup

Supported Devices

Allen-Bradley Bulletin 900-TC8
-TC8 w/Enhanced Features
-TC16
-TC16 w/Enhanced Features
-TC32

Communication Protocol

Allen-Bradley Bulletin 900-TCx Protocol as detailed in [Publication 900-UM004A-EN-E](#) -September 2003.
Allen-Bradley Bulletin 900-TCx Protocol as detailed in [Publication 900-UM004B-EN-E](#) -June 2005 (CompoWay/F(SYSWAY)).

Supported Communication Parameters

Baud Rate: 1200, 2400, 4800, 9600, 19200, 38400*
Parity: None, Even, or Odd
Data Bits: 7 or 8
Stop Bits: 1 or 2

*TC8 w/Enhanced Features and TC16 w/Enhanced Features only.

Ethernet Encapsulation

This driver supports Ethernet Encapsulation, which allows the driver to communicate with serial devices attached to an Ethernet network using a terminal server. It may be invoked through the COM ID dialog in Channel Properties. For more information, refer to the OPC server's help documentation.

Device IDs

This parameter specifies the unique ID that will be used in order to communicate with other devices. The valid range is 0 to 99.

Flow Control

When using an RS232/RS485 converter, the type of flow control that is required depends on the needs of the converter. Some converters do not require any flow control whereas others require RTS flow. Consult the converter's documentation in order to determine its flow requirements. An RS485 converter that provides automatic flow control is recommended.

Note: When using the manufacturer's supplied communications cable, it is sometimes necessary to choose a flow control setting of **RTS** or **RTS Always** under the Channel Properties.

Cable Connections

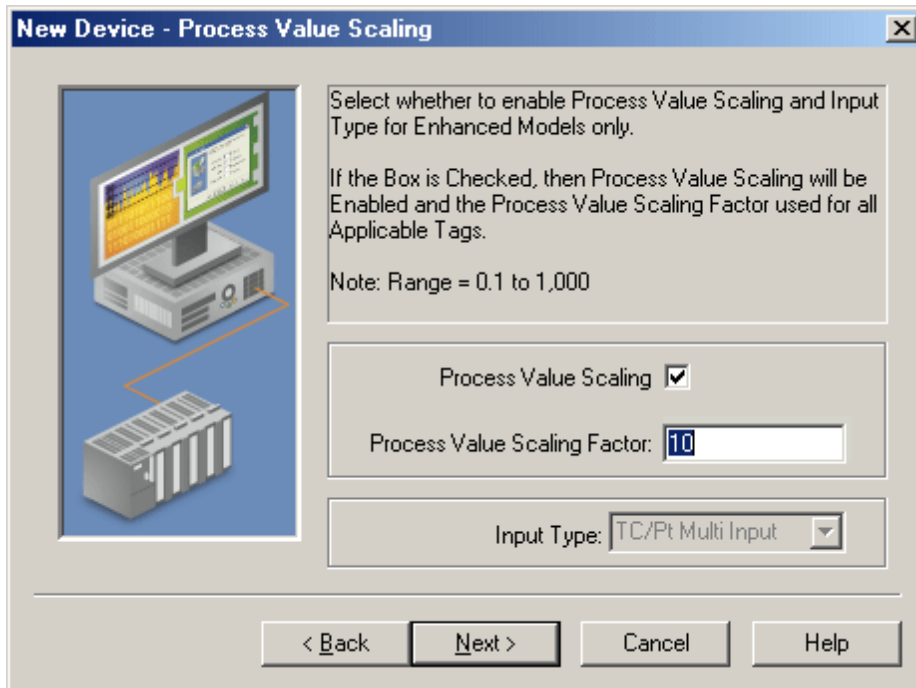
Refer to each individual controller's manual section on both Hardware Installation and Wiring in [Publication 900-UM004A-EN-E](#) or [900-UM004B-EN-E](#).

Process Value Scaling

Process Value Scaling (and its related parameters) scales values according to the input type. For an input type that has no scaling, the value read from the device will match that of the display. For an input type that is scaled by 10, the value read from the device will be 10 times that of the value displayed on the front panel. A division by 10 is necessary. Input type selection is used for enhanced models only. Some addresses are scaled differently depending on the input type of device. If this item is set incorrectly, the value returned by the driver will not match what is displayed by the device.

Process value scaling allows the driver to automatically perform scaling for reading and writing process value related parameters. It is handled by the driver in a similar fashion as parameters with fixed scaling by 10.

Note: To determine if scaling is required for a given input type, refer to the controller's manual section on sensor input setting ranges.



Descriptions of the parameters are as follows:

- **Process Value Scaling:** When checked, this setting will be enabled along with the Process Value Scaling Factor used for all applicable tags. For a list of tags, refer to [Data Types Description](#).
- **Process Value Scaling Factor:** This parameter specifies the scaling factor. The valid range is from 0.1 to 1,000.
- **Input Type:** This parameter specifies the type of input. There are two options: TC/Pt Multi Input or Analog Input.

Note: When process value scaling is disabled, it behaves the same as no scaling. For more information, refer to [Data Types Description](#).

Automatic Tag Database Generation

The Allen-Bradley Bulletin 900 Driver utilizes the OPC server's automatic tag database generation feature, which enables drivers to automatically create tags to access data. This is accomplished either by querying the device for its configuration or by using a fixed database to access information to build a tag database.

OPC Server Configuration

The automatic tag database generation feature can be customized to fit a specific application's needs. The primary control options are set during the Database Creation step of the Device Wizard, but may be accessed later by clicking **Device Properties | Database Creation**. For more information, refer to the OPC server's help documentation.

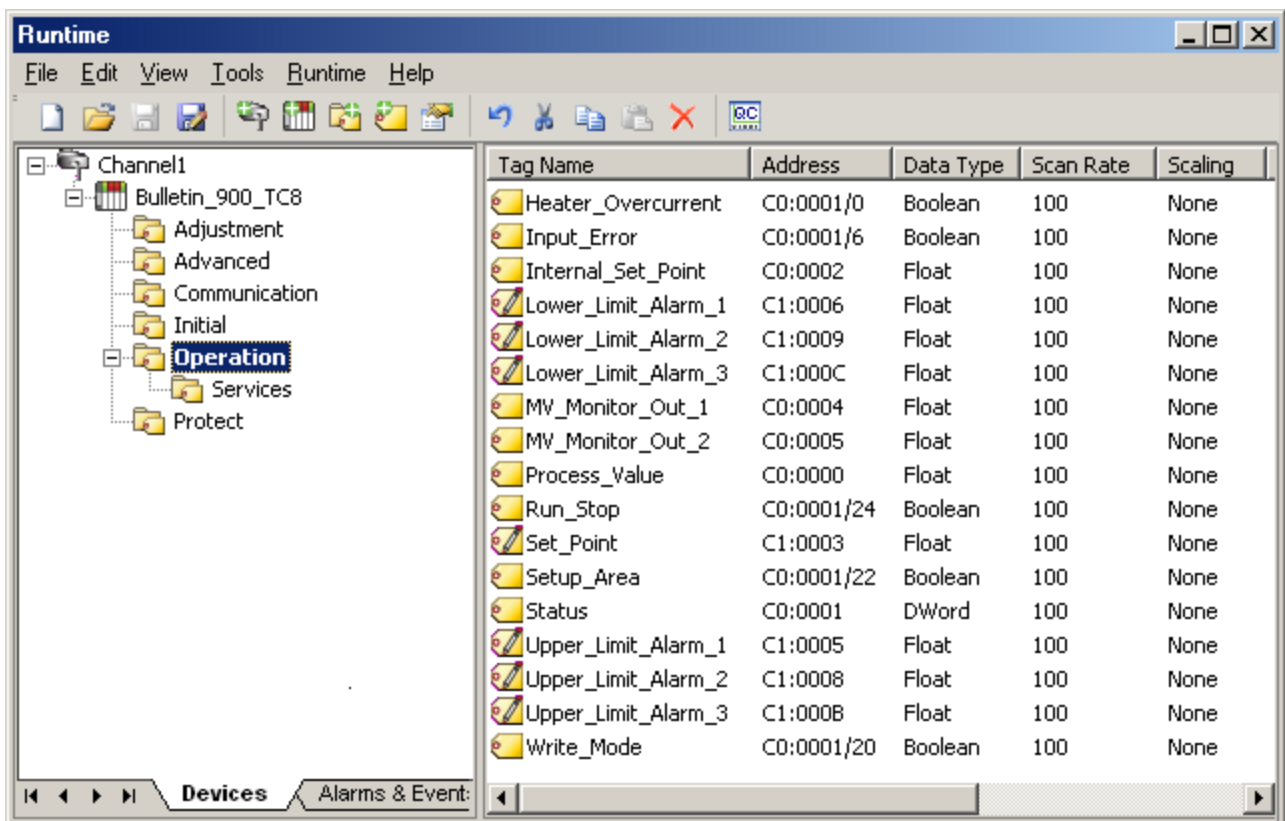
Operation

Depending on the configuration, tag generation may start automatically when the OPC server project starts or be initiated manually at some other time. The OPC server's Event Log will show when the tag generation process started, any errors that occurred while building the tag database and when the process was completed.

Group and Tag Naming

A group is created in the server for each group, excepting the operation and operational groups. These are combined into one Operation group. For more information (including the name that will be generated for each tag/address) refer to [Address Descriptions](#).

The image below displays the results of automatic tag database creation for a TC-8.



| Tag Name | Address | Data Type | Scan Rate | Scaling |
|---------------------|------------|-----------|-----------|---------|
| Heater_Overcurrent | C0:0001/0 | Boolean | 100 | None |
| Input_Error | C0:0001/6 | Boolean | 100 | None |
| Internal_Set_Point | C0:0002 | Float | 100 | None |
| Lower_Limit_Alarm_1 | C1:0006 | Float | 100 | None |
| Lower_Limit_Alarm_2 | C1:0009 | Float | 100 | None |
| Lower_Limit_Alarm_3 | C1:000C | Float | 100 | None |
| MV_Monitor_Out_1 | C0:0004 | Float | 100 | None |
| MV_Monitor_Out_2 | C0:0005 | Float | 100 | None |
| Process_Value | C0:0000 | Float | 100 | None |
| Run_Stop | C0:0001/24 | Boolean | 100 | None |
| Set_Point | C1:0003 | Float | 100 | None |
| Setup_Area | C0:0001/22 | Boolean | 100 | None |
| Status | C0:0001 | DWord | 100 | None |
| Upper_Limit_Alarm_1 | C1:0005 | Float | 100 | None |
| Upper_Limit_Alarm_2 | C1:0008 | Float | 100 | None |
| Upper_Limit_Alarm_3 | C1:000B | Float | 100 | None |
| Write_Mode | C0:0001/20 | Boolean | 100 | None |

Data Types Description

| Data Type | Description |
|-----------|---|
| DWord | <p>Read: Unsigned 32 bit value read from the device.</p> <p>Write: Value passed directly on to the device.</p> |
| Long | <p>Read: Unsigned 32 bit value read from the device.</p> <p>Write: Value passed directly on to the device.</p> |
| Float | <p>A scaling algorithm may be applied to each data item. The following information details each variation of type Float.</p> <p>No Scaling/Process Value Scaling Disabled</p> <p>Read: Value returned from the device is converted to Float.</p> <p>Write: Value written goes through the following conversion process before being sent to the device.</p> <ol style="list-style-type: none"> 1. Rounded to the next whole number. 2. Fractional part is removed. 3. Integer part is sent to the device. <p>Note: No scaling items can be identified if the hexadecimal range is the same as the decimal range.</p> <p>For example, C0:0009, Soak time remain monitor, 00000000 to 0000270F (0 to 9999).</p> <p>Variable Scaling (By Process Value Scaling Factor)*</p> <p>Read: Value returned from the device is converted to Float and then divided by the process value scaling factor.</p> <p>Write: Value written goes through the following conversion process before being sent to the device.</p> <ol style="list-style-type: none"> 1. Fractional part is rounded to the hundredths position. 2. Multiplied by the Process Value Scaling Factor. 3. Fractional part is removed. 4. Integer part is sent to the device. <p>Note: Variable scaling items are all of the process and set point related items. This includes the following specific addresses: C0:0000, C0:0002, C1:0003, C1:000E, C1:000F, C1:0010, C1:0011, C3:0005 and C3:0006.**</p> <p>Fixed Scaling (By an Address-Specific Scaling Factor)</p> <p>Read: Value returned from the device is converted to Float and then divided by the address's appropriate value.</p> <p>Write: Value written goes through the following conversion process before being sent to the device.</p> <ol style="list-style-type: none"> 1. Fractional part is rounded to the hundredths position. 2. Multiplied by the value appropriate for address. 3. Fractional part is removed. 4. Integer part is sent to the device. <p>Note: Fixed scaling items have an implied decimal point in the actual value transferred by the device. These can be identified by whether or not the hexadecimal range is different than the decimal range. For example, C0:0005, MV monitor (OUT2), 00000000 to 0000041A (0.0 to 105.0).</p> |
| Boolean | <p>Read: If the value returned from the device is zero, then FALSE is returned. If the value returned from device is nonzero, then TRUE is returned.</p> <p>Write: Value passed directly on to the device.</p> |

*This is only true if process value scaling is enabled.

**For information on setup, refer to [Process Value Scaling](#).

See Also: [Address Descriptions](#).

Address Descriptions

To form a tag address, combine a variable type and address and then separate them with a colon. Tag addresses have the following syntax: *Variable_Type:Address*. For examples of tag addresses, refer to the table below.

| Variable Type | Address | Tag Address |
|---------------|---------|-------------|
| C0 | 0000 | C0:0000 |
| C0 | 0001 | C0:0001 |

For the Status Item only (C0:0001), access to individual status bits listed in the Status Bits Table is provided using the following additional syntax: *Variable_Type:Address/Bit_Number*. For examples, refer to the table below. For more information, refer to [Status Bits Table](#).

| Variable Type | Address | Bit Number | Tag Address | Data Type |
|---------------|---------|------------|-------------|-----------|
| C0 | 0001 | 8 | C0:0001/8 | Boolean |
| C0 | 0001 | 9 | C0:0001/9 | Boolean |

Note: For information on how each data type is treated by driver, refer to [Data Types Description](#).

Bulletin 900-TCxx Groups

The tables below list the available tag addresses for each of the groups in the Bulletin 900-TCxx. Each group's setup area is detailed so that users will be able to determine whether a service command (to move to the appropriate setup area) is required when performing a write operation.

For example, before performing any write operation to a setup area 1 parameter, users must move to setup area 1 by using the Service 07 tag. To view the current setup area, refer to the corresponding bit in the status address. Before performing any write operation to a Protect Level Group parameter, users also need to move to protect level by using the Service 08 tag.

Setup Areas

| Area | Description |
|--------------|---|
| Setup Area 0 | This area groups together the protect, operation, operational and adjustment level/group. |
| Setup Area 1 | This area groups together the initial setting, communications setting, advanced function setting and calibration level/group. |

Note: Access to the Calibration Level Group is not provided by the driver.

Services Group

Services group tag addresses are primarily provided as a way to perform the same functionality as the front-panel keys. For example, pressing the level key for at least 3 seconds moves to the initial setting function group. This same functionality is provided by the Service 07 tag. Likewise, pressing the Level key for at least 1 second moves to the operations function group and displays the process value and set point. This same functionality is provided by Service 06 tag. For more information, refer to [Services Group table](#).

Quick Links to Tables

[Operational Level/Group \(Setup Area 0\)](#)

[Protect Level/Group \(Setup Area 0\)](#)

[Operation Level/Group \(Setup Area 0\)](#)

[Adjustment Level/Group \(Setup Area 0\)](#)

[Communications Setting Level/Group \(Setup Area 1\)](#)

[Initial Setting Level/Group \(Setup Area 1\)](#)

[Advanced Function Setting Level/Group \(Setup Area 1\)](#)

[Status Bits Table](#)

[Services Group](#)

Operational Level/Group - (Setup Area 0)

Operational Function Group - (Setup Area 0)

| Variable Type | Address | Item (Parameter) | Set Value | Access | Models | Data Types | ATG Name |
|---------------|---------|------------------|-----------|--------|--------|------------|----------|
|---------------|---------|------------------|-----------|--------|--------|------------|----------|

| | | | | | | | |
|----|------|---------------------------------|---|-----------|------------------------------|-----------------------------------|---------------------------|
| C0 | 0000 | Process value | Temperature: Follow the specified range of the sensor. Analog: Scaling lower limit -5%FS to scaling upper limit +5%FS | Read Only | All | Float DWord Long | Process_Value |
| C0 | 0001 | Status (1) | Refer to Status Bits Table | Read Only | All | DWord Long Float Boolean | Status |
| C0 | 0002 | Internal set point (1) | SP lower limit to SP upper limit | Read Only | All | Float DWord Long | Internal_Set_Point |
| C0 | 0003 | Heater current monitor | 00000000 to 00000226 (0.0 to 55.0) | Read Only | TC8, TC8 E TC16 TC16 E | Float DWord Long | Heater_Current_Monitor |
| C0 | 0004 | MV monitor (OUT1) | Standard: FFFFFFCE to 0000041A (-5.0 to 105.0) Heating and cooling: 00000000 to 0000041A (0.0 to 105.0) | Read Only | All | Float DWord Long | MV_Monitor_OUT_1 |
| C0 | 0005 | MV monitor (OUT2) | 00000000 to 0000041A (0.0 to 105.0) | Read Only | All | Float DWord Long | MV_Monitor_OUT_2 |
| C0 | 0006 | Heater current value 2 monitor | 00000000 to 00000226 (0.0 to 55.0) | Read Only | TC8 E TC16 E | Float DWord Long | Heater_Current_2_Monitor |
| C0 | 0007 | Leakage current value 1 monitor | 00000000 to 00000226 (0.0 to 55.0) | Read Only | TC8 E TC16 E | Float DWord Long | Leakage_Current_1_Monitor |
| C0 | 0008 | Leakage current value 2 monitor | 00000000 to 00000226 (0.0 to 55.0) | Read Only | TC8 E TC16 E | Float DWord Long | Leakage_Current_2_Monitor |
| C0 | 0009 | Soak time remain monitor | 00000000 to 0000270F (0 to 9999) | Read Only | TC8 E TC16 E | Float DWord Long | Soak_Time_Remain_Monitor |

Note: Not displayed on the controller's display.

Protect Level/Group - (Setup Area 0)

Protect Function Group - (Setup Area 0)

| Variable Type | Address | Item (Parameter) | Set Value | Access | Models | Data Types | ATG Name |
|---------------|---------|-----------------------------------|---|------------|--------|-----------------------------------|-----------------------|
| C1 | 0000 | Operation / adjustment protection | 00000000(0) No restrictions in operation and adjustment levels 00000001(1) Move to adjustment level restricted | Read/Write | All | DWord Long Float Boolean | Operation_Adj_Protect |

| | | | | | | | |
|----|------|-------------------------------------|---|------------|-----|--|--------------------------|
| | | | 00000002(2) Display and change of only "PV" and "PV/SP" parameters enabled | | | | |
| | | | 00000003(3) Display of only "PV" and "PV/SP" parameters enabled | | | | |
| C1 | 0001 | Initial setting / comms. protection | 00000000(0) Move to initial setting/comms. setting level enabled (move to advanced function setting level displayed) 00000001(1) Move to initial setting/comms. setting level enabled (move to advanced function setting level not displayed) 00000002(2) Move to initial setting / comms. setting level restricted | Read/Write | All | DWord Long Float Boolean | Initial_Set_Comm_Protect |
| C1 | 0002 | Setup change protection | 00000000(0) OFF (changing of setup on controller display enabled) 00000001(1) ON (changing of setup on controller display disabled) | Read/Write | All | DWord Long Float Boolean | Setup_Change_Protect |

Operation Level/Group - (Setup Area 0)**Operation Function Group - (Setup Area 0)**

| Variable Type | Address | Item (Parameter) | Set Value | Access | Models | Data Types | ATG Name |
|---------------|---------|-----------------------|--------------------------------------|------------|--------------------------|-------------------------------|--------------------|
| C1 | 0003 | Set point | SP lower limit to SP upper limit | Read/Write | All | Float DWord Long | Set_Point |
| C1 | 0004 | Alarm value 1 | FFFFF831 to 0000270F (-1999 to 9999) | Read/Write | All | Float DWord Long | Alarm_Value1 |
| C1 | 0005 | Upper-limit alarm 1 | FFFFF831 to 0000270F (-1999 to 9999) | Read/Write | All | Float DWord Long | Upper_Limit_Alarm1 |
| C1 | 0006 | Lower-limit alarm 1 | FFFFF831 to 0000270F (-1999 to 9999) | Read/Write | All | Float DWord Long | Lower_Limit_Alarm1 |
| C1 | 0007 | Alarm value 2 | FFFFF831 to 0000270F (-1999 to 9999) | Read/Write | TC8, TC8 E, TC16, TC16 E | Float DWord Long | Alarm_Value2 |
| C1 | 0008 | Upper-limit alarm 2 | FFFFF831 to 0000270F (-1999 to 9999) | Read/Write | TC8, TC8 E, TC16, TC16 E | Float DWord Long | Upper_Limit_Alarm2 |
| C1 | 0009 | Lower-limit alarm 2 | FFFFF831 to 0000270F (-1999 to 9999) | Read/Write | TC8, TC8 E, TC16, TC16 E | Float DWord Long | Lower_Limit_Alarm2 |
| C1 | 000A | Alarm value 3 (1) (2) | FFFFF831 to 0000270F | Read/Write | TC8, TC8 E, | Float DWord | Alarm_Value3 |

| | | | | | | | |
|----|------|--------------------------------|--|------------|--------------------------|-------------------------------|------------------------|
| | | | (-1999 to 9999) | | TC16 E | Long | |
| C1 | 000B | Upper-limit alarm 3 (1) (2) | FFFFF831 to 0000270F (-1999 to 9999) | Read/Write | TC8, TC8 E, TC16 E | Float DWord Long | Upper_Limit_ Alarm3 |
| C1 | 000C | Lower-limit alarm 3 (1) (2) | FFFFF831 to 0000270F (-1999 to 9999) | Read/Write | TC8, TC8 E, TC16 E | Float DWord Long | Lower_Limit_ Alarm3 |

Note 1: Only displayed on the 900-TC8. The alarm function can also be used on units without alarm outputs. In this case, confirm alarm occurrences via the status data.

Note 2: When alarm 3 is not assigned to an output, the parameter will not be shown on the controller's display.

Adjustment Level/Group - (Setup Area 0)

Adjustment Function Group - (Setup Area 0)

| Variable Type | Address | Item (Parameter) | Set Value | Access | Models | Data Types | ATG Name |
|---------------|---------|---|---|------------|-----------------------------------|-------------------------------|----------------------------------|
| C1 | 000D | Heater burnout detection | 00000000 to 000001F4 (0.0 to 50.0) | Read/Write | TC8, TC8 E, TC16, TC16 E | Float DWord Long | Heater_Burn- out_Detection |
| C1 | 000E | Set point 0 | SP lower limit to SP upper limit | Read/Write | All | Float DWord Long | Set_Point0 |
| C1 | 000F | Set point 1 | SP lower limit to SP upper limit | Read/Write | All | Float DWord Long | Set_Point1 |
| C1 | 0010 | Set point 2 | SP lower limit to SP upper limit | Read/Write | All | Float DWord Long | Set_Point2 |
| C1 | 0011 | Set point 3 | SP lower limit to SP upper limit | Read/Write | All | Float DWord Long | Set_Point3 |
| C1 | 0012 | Temperature input shift | FFFFF831 to 0000270F (-199.9 to 999.9) | Read/Write | All | Float DWord Long | Temp_Input_ Shift |
| C1 | 0013 | Upper-limit temperature input shift value | FFFFF831 to 0000270F (-199.9 to 999.9) | Read/Write | All | Float DWord Long | Upp_Lim_ Temp_Input_ Shift |
| C1 | 0014 | Lower-limit temperature input shift value | FFFFF831 to 0000270F (-199.9 to 999.9) | Read/Write | All | Float DWord Long | Low_Lim_ Temp_Input_ Shift |
| C1 | 0015 | Proportional band | 00000001 to 0000270F (0.1 to 999.9) | Read/Write | All | Float DWord Long | Proportional_ Band |
| C1 | 0016 | Integral time | 00000000 to 00000F9F (0 to 3999) | Read/Write | All | Float DWord Long | Integral_Time |
| C1 | 0017 | Derivative time | 00000000 to 00000F9F (0 to 3999) See Table 5.AF in Bulletin 900-TC8 and 900-TC16 User Manual | Read/Write | All | Float DWord Long | Derivative_ Time |
| C1 | 0018 | Cooling coefficient | 00000001 to 0000270F (0.01 to 99.99) | Read/Write | All | Float DWord Long | Cooling_Coeff- cient |
| C1 | 0019 | Dead band | FFFFF831 to 0000270F (-199.9 to 999.9) See Table 5.AH in Bulletin 900-TC8 and 900-TC16 User Manual | Read/Write | All | Float DWord Long | Dead_Band |

| | | | | | | | |
|----|------|-----------------------------|---|------------|-----------------|-------------------------------|---------------------------------------|
| C1 | 001A | Manual reset value | 00000000 to 000003E8 (0.0 to 100.0) | Read/Write | All | Float DWord Long | Manual_ Reset_Value |
| C1 | 001B | Hysteresis (OUT1) | 00000001 to 0000270F (0.1 to 999.9) See Table 5.AJ in Bulletin 900-TC8 and 900-TC16 User Manual | Read/Write | All | Float DWord Long | Hysteresis_ OUT1 |
| C1 | 001C | Hysteresis (OUT2) | 00000001 to 0000270F (0.1 to 999.9) See Table 5.AJ in Bulletin 900-TC8 and 900-TC16 User Manual | Read/Write | All | Float DWord Long | Hysteresis_ OUT2 |
| C1 | 001D | Heater burnout 2 detection | 00000000 to 000001F4 (0.0 to 50.0) | Read/Write | TC8 E TC16 E | Float DWord Long | Heater_Burn- out_2_Detec- tion |
| C1 | 001E | HS alarm 1 | 00000000 to 000001F4 (0.0 to 50.0) | Read/Write | TC8 E TC16 E | Float DWord Long | HS_Alarm_1 |
| C1 | 001F | HS alarm 2 | 00000000 to 000001F4 (0.0 to 50.0) | Read/Write | TC8 E TC16 E | Float DWord Long | HS_Alarm_2 |
| C1 | 0020 | Soak time | 00000001 to 0000270F (1 to 9999) | Read/Write | TC8 E TC16 E | Float DWord Long | Soak_Time |
| C1 | 0021 | Wait Band | 00000000 (0): OFF 00000001 to 0000270F (0.1 to 999.9 for TC/Pt multi-input models) (0.01 to 99.99 for Analog input models) See Table 5.AL in Bulletin 900-TC8 and 900-TC16 User Manual | Read/Write | TC8 E TC16 E | Float DWord Long | Wait_Band |
| C1 | 0022 | MV at stop | Standard: FFFFFFFE to 0000041A (-5.0 to 105.0) Heating and cooling: FFFFBE6 to 0000041A (-105.0 to 105.0) | Read/Write | TC8 E TC16 E | Float DWord Long | MV_at_Stop |
| C1 | 0023 | MV at PV error | Standard: FFFFFFFE to 0000041A (-5.0 to 105.0) Heating and cooling: FFFFBE6 to 0000041A (-105.0 to 105.0) | Read/Write | TC8 E TC16 E | Float DWord Long | MV_at_PV_ Error |
| C1 | 0024 | Manual manipulated variable | Standard: FFFFFFFE to 0000041A (-5.0 to 105.0) Heating and cooling: FFFFBE6 to 0000041A (-105.0 to 105.0) | Read/Write | TC8 E TC16 E | Float DWord Long | Manual_Manip- ulated_Var- iable |
| C1 | 0025 | SP ramp set value | 00000000 (0): OFF 00000001 to 0000270F (1 to 9999) | Read/Write | TC8 E TC16 E | Float DWord Long | SP_Ramp_ Set_Value |
| C1 | 0026 | MV upper limit | Standard: MV lower limit + 0.1 to 0000041A (MV lower limit + 0.1 to 105.0) Heating and cooling: 00000000 to 0000041A (0.0 to 105.0) | Read/Write | TC8 E TC16 E | Float DWord Long | MV_Upper_ Limit |
| C1 | 0027 | MV lower limit | Standard: FFFFFFFE to MV upper limit - 0.1 (-5.0 to MV upper limit - 0.1) Heating and cooling: FFFFBE6 to 00000000 (-105.0&0.0) | Read/Write | TC8 E TC16 E | Float DWord Long | MV_Lower_ Limit |
| C1 | 0028 | Move Protect function group | FFFFFF831 to 0000270F (-1999 to 9999) | Read/Write | TC8 E TC16 E | Float DWord Long | Move_Protect_ Group |
| C1 | 0029 | Password to | FFFFFF831 to 0000270F (-1999 to 9999) (Can only be set. | Read/Write | TC8 E TC16 E | Float | Password_ |

| | | | | | | | |
|----|------|--------------------------------|--|------------|-----------------|--|-----------------------|
| | | Move to Protect function group | The monitor value is always 00000000.) | | | DWord Long | Move2Protect_Group |
| C1 | 002A | Parameter mask enable | 00000000 (0): OFF 00000001 (1): ON | Read/Write | TC8 E TC16 E | DWord Long Float Boolean | Parameter_Mask_Enable |

Communications Setting Level/Group - (Setup Area 1)**Communications Setting Function Group - (Setup Area 1)**

| Variable Type | Address | Item (Parameter) | Set Value | Access | Models | Data Types | ATG Name |
|---------------|---------|--------------------------------|--|------------|--------|--|------------------|
| C3 | 0010 | Communications unit number (1) | 00000000 to 00000063 (0 to 99) | Read/Write | All | DWord Long Float Boolean | Comm_Unit_Number |
| C3 | 0011 | Baud rate (1) | 00000000(0) 1.2 00000001(1) 2.4 00000002(2) 4.8 00000003(3) 9.6 00000004(4) 19.2 | Read/Write | All | DWord Long Float Boolean | Baud_Rate |
| C3 | 0012 | Communications data length (1) | 00000007(7) 7 00000008(8) 8 | Read/Write | All | DWord Long Float Boolean | Comm_Data_Length |
| C3 | 0013 | Communications stop bit (1) | 00000001(1) 1 00000002(2) 2 | Read/Write | All | DWord Long Float Boolean | Comm_Stop_Bit |
| C3 | 0014 | Communications parity (1) | 00000000(0) None 00000001(1) Even 00000002(2) Odd | Read/Write | All | DWord Long Float Boolean | Comm_Parity |

Note: Communications parameters are enabled after they have been changed by resetting the controller.

Initial Setting Level/Group - (Setup Area 1)**Initial Setting Function Group - (Setup Area 1)**

| Variable Type | Address | Item (Parameter) | Set Value | Access | Models | Data Types | ATG Name |
|---------------|---------|---|--|------------|--------|--|-------------------|
| C3 | 0000 | Input type (1) | For models TC8 and TC16: see AB Publication 900-UM004A-EN-E (Sept. 2003) Chapter 3 - Communications Data, Initial Setting Level/Group table. | Read/Write | All | DWord Long Float Boolean | Input_Type |
| C3 | 0001 | Scaling upper limit | Scaling lower limit +1 to 0000270F (scaling lower limit +1 to 9999) | Read/Write | All | Float DWord Long | Scaling_Upp_Limit |
| C3 | 0002 | Scaling lower limit | FFFFF831 to Scaling upper limit -1 (-1999 to scaling upper limit -1) | Read/Write | All | Float DWord Long | Scaling_Low_Limit |
| C3 | 0003 | Decimal point position (TC/Pt multi-input models) | 00000000 to 00000001 (0 to 1) | Read/Write | All | DWord Long Float Boolean | Decimal_Point |
| C3 | 0004 | °C/°F selection | 00000000(0) °C 00000001(1) °F | Read/Write | All | DWord Long Float Boolean | Cels_Fahr_Select |

| | | | | | | | |
|----|------|------------------------------|---|------------|-----------------------------------|--|-----------------------|
| C3 | 0005 | SP upper limit | Temperature: SP lower limit + 1 to Input range upper limit Analog: SP lower limit + 1 to scaling upper limit | Read/Write | All | Float DWord Long | SP_Upp_Limit |
| C3 | 0006 | SP lower limit | Temperature: Input range lower limit to SP upper limit - 1 Analog: Scaling lower limit to SP upper limit - 1 | Read/Write | All | Float DWord Long | SP_Low_Limit |
| C3 | 0007 | PID/ ON/OFF | 00000000(0) ON/OFF 00000001(1) 2-PID | Read/Write | All | DWord Long Float Boolean | PID_OnOff_Select |
| C3 | 0008 | Standard/Heating and cooling | 00000000(0) Standard 00000001(1) Heating and cooling | Read/Write | All | DWord Long Float Boolean | Std_Heat-Cool_Select |
| C3 | 0009 | ST | 00000000(0) OFF 00000001(1) ON | Read/Write | All | DWord Long Float Boolean | Self_Tuning |
| C3 | 000A | Control period (OUT1) | 00000001 to 00000063 (1 to 99) | Read/Write | All | DWord Long Float Boolean | Control_Period_OUT1 |
| C3 | 000B | Control period (OUT2) | 00000001 to 00000063 (1 to 99) | Read/Write | All | DWord Long Float Boolean | Control_Period_OUT2 |
| C3 | 000C | Direct/reverse operation | 00000000(0) Reverse operation 00000001(1) Direct operation | Read/Write | All | DWord Long Float Boolean | Direct_Reverse_Select |
| C3 | 000D | Alarm 1 type | 00000000(0) Alarm function OFF 00000001(1) Upper- and lower-limit alarm 00000002(2) Upper-limit alarm 00000003(3) Lower-limit alarm 00000004(4) Upper- and lower-limit range alarm 00000005(5) Upper- and lower-limit alarm with standby sequence 00000006(6) Upper-limit alarm with standby sequence 00000007(7) Lower-limit alarm with standby sequence 00000008(8) Absolute-value upper-limit alarm 00000009(9) Absolute-value lower-limit alarm 0000000A(10) Absolute-value upper-limit alarm with standby sequence 0000000B(11) Absolute-value lower-limit alarm with standby sequence 0000000C(12) LBA (Loop Burnout alarm) | Read/Write | All | DWord Long Float Boolean | AlarmType1 |
| C3 | 000E | Alarm 2 type | Same as alarm 1 type without Setting 12 | Read/Write | TC8, TC8 E, TC16, TC16 E | DWord Long Float Boolean | AlarmType2 |

| | | | | | | | |
|----|------|-------------------------|---|------------|-----------------------------|--|------------|
| C3 | 000F | Alarm 3 type (1) (2) | Same as alarm 1 type without Setting 12 | Read/Write | TC8, TC8 E, TC16 E | DWord Long Float Boolean | AlarmType3 |
|----|------|-------------------------|---|------------|-----------------------------|--|------------|

Note 1: The input type can be selected according to the compatible sensor connected to the controller (depending on the controller catalog number).

Note 2: The parameter will not be shown on the controller's display when alarm 3 is not assigned to an output.

Advanced Function Setting Level/Group - (Setup Area 1)

Advanced Function Setting Function Group - (Setup Area 1)

| Variable Type | Address | Item (Parameter) | Set Value | Access | Models | Data Types | ATG Name |
|---------------|---------|-------------------------------|---|------------|--------------------|--|--------------------------|
| C3 | 0015 | Number of multi-SP uses | 00000000 (0): No multi-SP 00000001 (1): 2SP 00000002 (2): 4SP | Read/Write | TCE 8 TCE 16 | DWord Long Float Boolean | Number_MultiSP_Uses |
| C3 | 0016 | Event input assignment 1 | 00000000 (0): None 00000001 (1): RUN/STOP (Cannot be set if the Number of Multi-SP Uses is set to 1 or 2.) 00000002 (2): Auto/Manual (Cannot be set if the Number of Multi-SP Uses is set to 1 or 2.) 00000003 (3): Program Start (Cannot be set if the Number of Multi-SP Uses is set to 1 or 2.) | Read/Write | TCE 8 TCE 16 | DWord Long Float Boolean | Event_Input_Assignment_1 |
| C3 | 0017 | Event input assignment 2 | 00000000 (0): None 00000001 (1): RUN/STOP (Cannot be set if the Number of Multi-SP Uses is set to 2.) 00000002 (2): Auto/Manual (Cannot be set if the Number of Multi-SP Uses is set to 2.) 00000003 (3): Program Start (Cannot be set if the Number of Multi-SP Uses is set to 2.) | Read/Write | TCE 8 TCE 16 | DWord Long Float Boolean | Event_Input_Assignment_2 |
| C3 | 001A | Multi-SP | 00000000(0) OFF 00000001(1) ON | Read/Write | All | DWord Long Float Boolean | Multi_SP |
| C3 | 001B | SP ramp time unit | 00000000(0) EU/second 00000001(1) EU/minute | Read/Write | All | DWord Long Float Boolean | Spare/SP_Ramp_Time_Unit |
| C3 | 001C | SP ramp set value | 00000000(0) OFF 00000001 to 0000270F (1 to 9999) | Read/Write | All | Float DWord Long | SP_Ramp_Set_Value |
| C3 | 001D | Standby sequence reset method | 00000000(0) Condition A 00000001(1) Condition B | Read/Write | All | DWord Long Float Boolean | Standby_Seq_Reset_Method |
| C3 | 001E | Alarm 1 open in alarm | 00000000(0) Close in alarm 00000001(1) Open in alarm | Read/Write | All | DWord Long Float Boolean | Alarm1_Open_In_Alarm |
| C3 | 001F | Alarm 1 hysteresis | 00000001 to 0000270F (0.1 to 999.9) See Table 5.BY in Bulletin 900-TC8 and 900-TC16 User Manual | Read/Write | All | Float DWord Long | Alarm1_Hysteresis |

| | | | | | | | |
|----|------|-------------------------------|--|------------|--------------------------------------|--|------------------------------|
| C3 | 0020 | Alarm 2 open in alarm | 00000000(0) Close in alarm 00000001(1) Open in alarm | Read/Write | TC8, TC8 E, TC16, TC16 E | DWord Long Float Boolean | Alarm2_ Open_In_ Alarm |
| C3 | 0021 | Alarm 2 hys-teresis | 00000001 to 0000270F (0.1 to 999.9) See Table 5.BY in Bulletin 900-TC8 and 900-TC16 User Manual | Read/Write | TC8, TC8 E, TC16, TC16 E | Float DWord Long | Alarm2_Hys-teresis |
| C3 | 0022 | Alarm 3 open in alarm (1) (2) | 00000000(0) Close in alarm 00000001(1) Open in alarm | Read/Write | TC8, TC8 E, TC16 E | DWord Long Float Boolean | Alarm3_ Open_In_ Alarm |
| C3 | 0023 | Alarm 3 hys-teresis (1) (2) | 00000001 to 0000270F (0.1 to 999.9) See Table 5.BY in Bulletin 900-TC8 and 900-TC16 User Manual | Read/Write | TC8, TC8 E, TC16 E | Float DWord Long | Alarm3_Hys-teresis |
| C3 | 0024 | HBA used | 00000000(0) OFF 00000001(1) ON | Read/Write | TC8, TC8 E, TC16, TC16 E | DWord Long Float Boolean | HBA_Used |
| C3 | 0025 | Heater burn-out latch | 00000000(0) OFF 00000001(1) ON | Read/Write | TC8, TC8 E, TC16, TC16 E | DWord Long Float Boolean | Heater_Burn-out_Latch |
| C3 | 0026 | Heater burn-out hys-teresis | 00000001 to 00001F4 (0.1 to 50.0) | Read/Write | TC8, TC8 E, TC16, TC16 E | Float DWord Long | Heater_Burn-out_Hys-teresis |
| C3 | 0027 | ST stable range | 00000001 to 0000270F (0.1 to 999.9) | Read/Write | All | Float DWord Long | ST_Stable_Range |
| C3 | 0028 | α | 00000000 to 00000064 (0.00 to 1.00) | Read/Write | All | Float DWord Long | Alpha |
| C3 | 0029 | MV upper limit | Standard: MV lower limit +0.1 to 000041A (MV lower limit +0.1 to 105.0) Heating and cooling: 00000000 to 0000041A (0.0 to 105.0) | Read/Write | All | Float DWord Long | MV_Upper_Limit |
| C3 | 002A | MV lower limit | Standard: FFFFFFFCE to MV upper limit -0.1 (-5.0 to MV upper limit -0.1) Heating and cooling: FFFFBE6 to 00000000 (-105.0 to 0.0) | Read/Write | All | Float DWord Long | MV_Lower_Limit |
| C3 | 002B | Input digital filter | 00000000 to 0000270F (0.0 to 999.9) | Read/Write | All | Float DWord Long | Input_Dig-ital_Filter |
| C3 | 002C | Additional PV display | 00000000(0) OFF 00000001(1) ON | Read/Write | All | DWord Long Float Boolean | Additional_PV_Display |

| | | | | | | | |
|----|------|-----------------------------------|--|------------|-----------------------------------|--|---------------------------|
| C3 | 002D | MV display | 00000000(0) OFF (display of manipulated variable OFF) 00000001(1) ON (display of manipulated variable ON) | Read/Write | All | DWord Long Float Boolean | MV_Display |
| C3 | 002E | Automatic return of display mode | 00000000(0) OFF 00000001 to 00000063 (1 to 99) | Read/Write | All | DWord Long Float Boolean | Auto_Return_Display_Mode |
| C3 | 002F | Alarm 1 latch | 00000000(0) OFF 00000001(1) ON | Read/Write | All | DWord Long Float Boolean | Alarm1_Latch |
| C3 | 0030 | Alarm 2 latch | 00000000(0) OFF 00000001(1) ON | Read/Write | TC8, TC8 E, TC16, TC16 E | DWord Long Float Boolean | Alarm2_Latch |
| C3 | 0031 | Alarm 3 latch (1) (2) | 00000000(0) OFF 00000001(1) ON | Read/Write | TC8, TC8 E, TC16 E | DWord Long Float Boolean | Alarm3_Latch |
| C3 | 0032 | Protect level move time | 00000001 to 0000001E (1 to 30) | Read/Write | All | DWord Long Float Boolean | Protect_Level_Move_Time |
| C3 | 0033 | Input error output | 00000000(0) OFF 00000001(1) ON | Read/Write | All | DWord Long Float Boolean | Input_Error_Output |
| C3 | 0034 | Cold junction compensation method | 00000000(0) OFF 00000001(1) ON | Read/Write | All | DWord Long Float Boolean | Cold_Junction_Comp_Method |
| C3 | 0035 | MB command logic switching 1 (3) | 00000000(0) OFF 00000001(1) ON | Read/Write | All | DWord Long Float Boolean | MB_Cmd_Logic_Switching1 |
| C3 | 0036 | PV color change 2 (4) | For models TC8 and TC16: see AB Publication 900-UM004A-EN-E (Sept. 2003) Chapter 3 - Communications Data, Advanced Function Setting Level/Group table. For models TC8 Enhanced and TC16 Enhanced: see AB Publication 900-UM004B-EN-E (June 2005) Chapter 3 - Communications Data, Advanced Function Setting Function Group table. | Read/Write | TC8 E, TC16, TC16 E | DWord Long Float Boolean | PV_Color_Change2 |
| C3 | 0037 | PV stable band 2 | 00000001 to 0000270F (0.1 to 999.9) See Table 5.CO in Bulletin 900-TC8 and 900-TC16 User Manual | Read/Write | TC8 E, TC16, TC16 E | Float DWord Long | PV_Stable_Band2 |
| C3 | 0038 | Alarm 1 ON delay | 00000000 to 000003E7 (0 to 999) | Read/Write | TC8 E TC16 E | Float DWord Long | Alarm_1_ON_Delay |
| C3 | 0039 | Alarm 2 ON delay | 00000000 to 000003E7 (0 to 999) | Read/Write | TC8 E TC16 E | Float DWord Long | Alarm_2_ON_Delay |
| C3 | 003A | Alarm 3 ON delay (2) (5) | 00000000 to 000003E7 (0 to 999) | Read/Write | TC8 E TC16 E | Float DWord Long | Alarm_3_ON_Delay |
| C3 | 003B | Alarm 1 OFF delay | 00000000 to 000003E7 (0 to 999) | Read/Write | TC8 E TC16 E | Float DWord Long | Alarm_1_OFF_Delay |

| | | | | | | | |
|----|------|--|--|------------|--------------------|--|---|
| C3 | 003C | Alarm 2 OFF delay | 00000000 to 000003E7 (0 to 999) | Read/Write | TC8 E TC16 E | Float DWord Long | Alarm_2_ OFF_Delay |
| C3 | 003D | Alarm 3 OFF delay (2) (5) | 00000000 to 000003E7 (0 to 999) | Read/Write | TC8 E TC16 E | Float DWord Long | Alarm_3_ OFF_Delay |
| C3 | 003E | Transfer output type | 00000000 (0): OFF 00000001 (1): Set point 00000002 (2): Set point during SP ramp 00000003 (3): PV 00000004 (4): MV monitor (heating) 00000005 (5): MV monitor (cooling) | Read/Write | TC8 E TC16 E | Float DWord Long | Transfer_ Output_Type |
| C3 | 003F | Transfer output upper limit | FFFFFF831 to H'0000270F (–1999 to 9999) (See note 7 below) See Table 5.BJ in Bulletin 900-TC8 and 900-TC16 User Manual | Read/Write | TC8 E TC16 E | Float DWord Long | Transfer_ Output_ Upper_Limit |
| C3 | 0040 | Transfer output lower limit | FFFFFF831 to H'0000270F (–1999 to 9999) (See note 7 below) See Table 5.BJ in Bulletin 900-TC8 and 900-TC16 User Manual | Read/Write | TC8 E TC16 E | Float DWord Long | Transfer_ Output_ Lower_Limit |
| C3 | 0041 | Linear current output | 00000000 (0): 4 to 20 mA 00000001 (1): 0 to 20 mA | Read/Write | TC8 E TC16 E | DWord Long Float Boolean | Linear_Cur- rent_Output |
| C3 | 0042 | Input shift type | 00000000 (0): Temperature input 1-point shift 00000001 (1): Temperature input 2-point shift | Read/Write | TC8 E TC16 E | DWord Long Float Boolean | Input_Shift_ Type |
| C3 | 0043 | MV at stop and error addition | 00000000 (0): OFF 00000001 (1): ON | Read/Write | TC8 E TC16 E | DWord Long Float Boolean | MV_at_ Stop_Error_ Add |
| C3 | 0044 | Auto/manual switching display addition | 00000000 (0): OFF 00000001 (1): ON | Read/Write | TC8 E TC16 E | DWord Long Float Boolean | Auto_Man- ual_Switch_ Display_Add |
| C3 | 0045 | RT | 00000000 (0): OFF 00000001 (1): ON | Read/Write | TC8 E TC16 E | DWord Long Float Boolean | RT |
| C3 | 0046 | HS alarm | 00000000 (0): OFF 00000001 (1): ON | Read/Write | TC8 E TC16 E | DWord Long Float Boolean | HS_Alarm |
| C3 | 0047 | HS alarm latch | 00000000 (0): OFF 00000001 (1): ON | Read/Write | TC8 E TC16 E | DWord Long Float Boolean | HS_Alarm_ Latch |
| C3 | 0048 | HS alarm hysteresis | 00000001 to 000001F4 (0.1 to 50.0) | Read/Write | TC8 E TC16 E | Float DWord Long | HS_Alarm_ Hysteresis |
| C3 | 0049 | LBA detection time | 00000000 to 0000270F (0 to 9999) | Read/Write | TC8 E TC16 E | Float DWord Long | LBA_Detec- tion_Time |
| C3 | 004A | LBA function group | 00000001 to 0000270F (0.1 to 999.9 for TC/Pt multi-input models) (0.01 to 99.99 for Analog input models) See Table 5.CZ in Bulletin 900-TC8 and | Read/Write | TC8 E TC16 E | Float DWord Long | LBA_Func- tion_Group |

| | | | | | | | |
|----|------|-----------------------------|--|------------|--------------------|--|-----------------------------|
| | | | 900-TC16 User Manual | | | | |
| C3 | 004B | LBA band | 00000000 to 0000270F (0.0 to 999.9 for TC/Pt multi-input models) (0.00 to 99.99 for Analog input models) See Table 5.DA in Bulletin 900-TC8 and 900-TC16 User Manual | Read/Write | TC8 E TC16 E | Float DWord Long | LBA_Band |
| C3 | 004C | Protocol Setting (6) | 00000000 (0): CompoWay/F (SYSWAY) 00000001 (1): Modbus | Read/Write | TC8 E TC16 E | DWord Long Float Boolean | Protocol_Setting |
| C3 | 004D | Send data wait time (6) | 00000000 to 00000063 (0 to 99) | Read/Write | TC8 E TC16 E | DWord Long Float Boolean | Send_Data_Wait_time |
| C3 | 004E | Control output 1 assignment | When control output 1 is a linear output: 00000000 (0): Not assigned. 00000001 (1): Control output (heating) 00000002 (2): Control output (cooling) When control output 1 is a pulse output: 00000000 (0): Not assigned. 00000001 (1): Control output (heating) 00000002 (2): Control output (cooling) 00000003 (3): Alarm 1 00000004 (4): Alarm 2 00000005 (5): Alarm 3 00000006 (6): Program end output (7) | Read/Write | TC8 E TC16 E | DWord Long Float Boolean | Control_Output_1_Assignment |
| C3 | 004F | Control output 2 assignment | 00000000 (0): Not assigned. 00000001 (1): Control output (heating) 00000002 (2): Control output (cooling) 00000003 (3): Alarm 1 00000004 (4): Alarm 2 00000005 (5): Alarm 3 00000006 (6): Program end output (7) | Read/Write | TC8 E TC16 E | DWord Long Float Boolean | Control_Output_2_Assignment |
| C3 | 0050 | Alarm 1 assignment | 00000000 to 00000006 (0 to 6) * Same settings as control output 2 assignments | Read/Write | TC8 E TC16 E | DWord Long Float Boolean | Alarm_1_Assignment |
| C3 | 0051 | Alarm 2 assignment | 00000000 to 00000006 (0 to 6) * Same settings as control output 2 assignments | Read/Write | TC8 E TC16 E | DWord Long Float Boolean | Alarm_2_Assignment |
| C3 | 0052 | Display character switch | 00000000 (0): OFF 00000001 (1): ON | Read/Write | TC8 E TC16 E | DWord Long Float Boolean | Display_Character_Switch |
| C3 | 0053 | Program pattern | 00000000 (0): OFF 00000001 (1): STOP 00000002 (2): CONT | Read/Write | TC8 E TC16 E | DWord Long Float Boolean | Program_Pattern |
| C3 | 0054 | Soak time units | 00000000 (0): Minutes 00000001 (1): Hours | Read/Write | TC8 E TC16 E | DWord Long Float Boolean | Soak_Time_Units |
| C3 | 0055 | Alarm SP selection | 00000000 (0): Set point during SP ramp 00000001 (1): Set point | Read/Write | TC8 E TC16 E | DWord Long Float Boolean | Alarm_SP_Selection |
| C3 | 0056 | Alarm 3 assignment | 00000000 to 00000006 (0 to 6) | Read/Write | TC8 E | DWord Long | Alarm_3_Assignment |

| | | | | | | | |
|--|--|--|---|--|--------|---------------|--|
| | | | * Same settings as control output 2 assignments | | TC16 E | Float Boolean | |
|--|--|--|---|--|--------|---------------|--|

Notes:

1. This applies only to 900-TCB.
2. The parameter will not be shown on the controller's display when Alarm 3 is not assigned to an output.
3. This does not apply to 900TCx protocol.
4. The logic is switched only in the MB command (SYSWAY). The logic of CompoWay/F operation command code 00 (communications writing) is not influenced.
5. This does not apply to 900-TCx protocol.
6. After communication parameters have been changed, they are enabled by resetting the controller.
7. The program end output can be set when the Program Pattern is not set to 0 (off).

Status Bits Table

| Bit Position | Status | Bit Description 0 | Bit Description | Access | Models | Data Type | ATG Name |
|--------------|--|-------------------|-----------------|--------|--------------------------|-----------|------------------------|
| 0 | Heater overcurrent | Not generated | Generated | Read | TC8, TC8 E, TC16, TC16 E | Boolean | Heater_Over-current |
| 1 | Heater current hold (1) | Updated | Hold | Read | TC8, TC8 E, TC16, TC16 E | Boolean | Heater_Current_Hold |
| 2 | HB (HBA) error | Not generated | Generated | Read | TC8, TC8 E, TC16, TC16 E | Boolean | HB_HBA_Error |
| 3 | HS alarm output (CT1) | OFF | ON | Read | TC8 E, TC16 E | Boolean | HS_Alarm_Output_CT1 |
| 4 | Spare (3) | | | | | | |
| 5 | Display range exceeded | Not generated | Generated | Read | All | Boolean | Display_Range_Exceeded |
| 6 | Input error | Not generated | Generated | Read | All | Boolean | Input_Error |
| 7 | Spare | | | | | | |
| 8 | Control output 1 (2) | OFF | ON | Read | All | Boolean | Control_Output1 |
| 9 | Control output 2 | OFF | ON | Read | All | Boolean | Control_Output2 |
| 10 | HB (HBA) output | OFF | ON | Read | TC8, TC8 E, TC16, TC16 E | Boolean | HB_HBA_Output |
| 11 | HB (heater burnout) alarm output (CT2) | OFF | ON | Read | TC8 E, TC16 E | Boolean | HB_HBA_Output_CT2 |
| 12 | Alarm output 1 | OFF | ON | Read | All | Boolean | Alarm_Output1 |
| 13 | Alarm output 2 | OFF | ON | Read | TC8, TC8 E, TC16, TC16 E | Boolean | Alarm_Output2 |
| 14 | Alarm output 3 | OFF | ON | Read | TC8, TC8 E, TC16 E | Boolean | Alarm_Output3 |
| 15 | Program end output | OFF | ON | Read | TC8 E, TC16 E | Boolean | Program_End_Output |
| 16 | Event input 1 | OFF | ON | Read | TC8 E, TC16 E | Boolean | Event_Input_1 |
| 17 | Event input 2 | OFF | ON | Read | TC8 E, TC16 E | Boolean | Event_Input_2 |
| 18 | Spare | | | | | | |
| 19 | Spare | | | | | | |
| 20 | Write mode (4) | Backup mode | RAM write mode | Read | All | Boolean | Write_Mode |

| | | | | | | | |
|----|-------------------------------|-------------------|---------------------------|------|-----------------|----------------|-------------------------|
| 21 | EEPROM | RAM Equals EEPROM | RAM Does Not Equal EEPROM | Read | All | Boolean | EEPROM |
| 22 | Setup area | Setup area 0 | Setup area 1 | Read | All | Boolean | Setup_Area |
| 23 | AT execute/cancel | AT canceled | AT execution in progress | Read | All | Boolean | AT_Execute_Cancel |
| 24 | Run/Stop | Run | Stop | Read | All | Boolean | Run_Stop |
| 25 | Communications writing (4) | OFF (disabled) | ON (enabled) | Read | All | Boolean | Communications_Writing |
| 26 | Auto/manual | Automatic mode | Manual mode | Read | TC8 E TC16 E | Boolean | Auto_Manual_Switch |
| 27 | Spare | | | | | | |
| 28 | Heater overcurrent (CT2) | Not generated | Generated | Read | TC8 E TC16 E | Boolean | Heater_Overcurrent_CT2 |
| 29 | Heater current hold (CT2) (1) | Update | Hold | Read | TC8 E TC16 E | Boolean | Heater_Current_Hold_CT2 |
| 30 | Spare | | | | | | |
| 31 | HS alarm output (CT2) | OFF | ON | Read | TC8 E TC16 E | Boolean | HS_Alarm_Output_CT2 |

Notes:

- "1" is set and the heater current is held at the immediately previous current value when the control output ON time is less than 190 ms.
- This is OFF whenever the control output is the current output.
- "Spare" bits are always OFF.
- The driver sends a command to set communications writing to On and a command to set write mode to RAM as part of the process of establishing communications with the device. This is why users will see the CMW front-panel indicator light when Communication is established with the device for the 1st time. The driver does not set Communications writing to off at any time. Setting write mode to RAM and providing a service tag to save the data in RAM is necessary to prevent premature failure of the controller's EEPROM if the write mode was always set to EEPROM / backup.

Services Group

| Variable Type | Address | Description | Set Value monitor value is always 0 | Access | Models | Data Types | ATG Name |
|---------------|---------|---|--|--------|-----------------|-------------|---------------------------------|
| SV | 0001 | Run/Stop (2) | 00: Run 01: Stop | Write | All | Byte | RUN_STOP |
| SV | 0002 | Multi-SP | 00: Set point 0 01: Set point 1 02: Set point 2 03: Set point 3 | Write | All | Byte | MULTI_SP_SELECT |
| SV | 0003 | AT execute /cancel (2) | 00: Cancel 01: AT execute | Write | All | Byte | AUTOTUNE_EXEC_CANCEL |
| SV | 0005 | Save RAM data (1) (2) | 00: Perform Operation | Write | All | Byte | SAVE_SETUP_AREA_0_AND_1_CHANGES |
| SV | 0006 | Software reset and Move to setup area 0 (3) | 00: Perform Operation | Write | All | Byte | RESET_AND_MOVE2_SETUP_AREA_0 |
| SV | 0007 | Move to setup area 1 (2) | 00: Perform Operation | Write | All | Byte | MOVE2_SETUP_AREA_1 |
| SV | 0008 | Move to protect level | 00: Perform Operation | Write | All | Byte | MOVE2_PROTECT_LEVEL |
| SV | 0009 | Auto/manual switch | 00: Automatic mode 01: Manual mode | Write | TC8 E TC16 E | Byte | AUTO_MANUAL_SWITCH |
| SV | 000B | Parameter initialization | 00: Initialize to defaults | Write | TC8 E TC16 E | Byte | PARAMETER_INITIALIZATION |

| | | | | | | | |
|----|------|--|---|-------|--------------------|---------------|-------------------------------------|
| SV | 0011 | Program start | 00: Reset 01: Start | Write | TC8 E TC16 E | Byte | PROGRAM START |
| SV | 0503 | This service reads the model number (see note at right). | The model number is expressed in 10-byte ASCII. For example, model 900-TC8VGT3Z2S is expressed as 900-TC8VGT. | Read | TC8 E TC16 E | String | READ_CON- TROLLER_ ATTRIBUTES |

Note 1: Use Service 05 tag to save any changes made to the configuration to nonvolatile memory (EEPROM) within the device.

Note 2: Users can check to see if RAM equals EPROM, Run/Stop state, Auto Tune execute/cancel state and the current setup area by looking at the corresponding bit in the status address.

Note 3: No response is returned for this service. This means that if a write request is received before the driver can detect a loss of communications with device, then the write will complete successfully.

Error Descriptions

The following error/warning messages may be generated. Click on the link for a description of the message.

Address Validation

[Missing address](#)

[Device address '<address>' contains a syntax error](#)

[Address '<address>' is out of range for the specified device or register](#)

[Device address '<address>' is not supported by model '<model name>'](#)

[Data Type '<type>' is not valid for device address '<address>'](#)

[Device address '<address>' is read only](#)

Serial Communications

[COMn does not exist](#)

[Error opening COMn](#)

[COMn is in use by another application](#)

[Unable to set comm parameters on COMn](#)

[Communications error on '<channel name>' \[<error mask>\]](#)

Device Status Messages

[Device '<device name>' is not responding](#)

[Unable to write to '<address>' on device '<device name>'](#)

[Device '<device name>' responded with error. \(Tag '<tag address>'\)](#)

Automatic Tag Database Generation Messages

[Unable to generate a tag database for device '<device name>'](#)

See Also:

[Allen-Bradley 900 Error Codes List](#)

Allen-Bradley 900 Error Codes List

End Codes

| End Code | Name | Description | Error Detection Priority |
|----------|--------------------|---|--------------------------|
| 00 | Normal completion | The command ended normally without error. | None |
| 0F | Command Text Error | The command text could not be executed.* | 8 |
| 10 | Parity error | The sum total of bits whose received data is "1" does not match the set value of communications parity. | 2 |
| 11 | Framing error | Stop bit is "0". | 1 |
| 12 | Overrun error | An attempt was made to transfer new data when the reception data was already full. | 3 |
| 13 | BCC error | The calculated BCC value is different from the received BCC value. | 5 |
| 14 | Format error | The command text contains characters other than 0 to 9, and A to F. This error is not applicable to the echo-back test. Refer to Echoback Test on page 2-14 for more information. No SID and command text. Or, no command text. MRC/SRC not included in command text. | 7 |
| 16 | Sub-address error | Illegal (unsupported) sub-address. No sub-address, SID and command text. Sub-address less than two characters, and no SID and command text. | 6 |
| 12 | Frame length error | The received frame exceeds the fixed (supported) number of bytes. | 4 |

*For information on the cause of the command failure, refer to the Response Code table below.

Response Codes

| Response Code | Name | Description | Error Detection Priority |
|----------------------|------------------------------------|--|---------------------------------|
| 0000 | Normal completion | No errors were found. | None |
| 0401 | Unsupported command | The service function for the relevant command is not supported. | 1 |
| 1001 | Command too long | The command is too long. | 2 |
| 1002 | Command too short | The command is too short. | 3 |
| 1101 | Area type error | The variable type is wrong. | 4 |
| 1103 | Start address out-of-range | The Read/Write start address is out of range. | 5 |
| 1104 | End address out-of-range | The write end address (write start address + number of elements) exceeds the final address of the variable area. | 6 |
| 1003 | Number of elements / data mismatch | The number of data does not match the number of elements. | 7 |
| 110B | Response too long | The response exceeds the communications buffer size (when larger than number of elements 0002). | 8 |
| 1100 | Parameter error | The bit position is other than "00". Variable Types C0, C1, C3. The write data is out of the setting range. Variable Types C1, C3. The instruction code and related information in the operating instruction is wrong. Variable Type SV. | 9 |
| 3003 | Read Only error | Variable type "CO" was written to. | 10 |
| 2203 | Operation error | The communications writing parameter is set to "OFF" (disabled). Writing was carried out on a parameter in setup area 1 when in setup area 0. Writing was carried out on a protect level parameter when not in protect level. Writing was carried out during AT execution. EEPROM error. Processing is not possible by operating instruction/service. Note: For more information, refer to Service Specific Causes. | 11 |

Service Specific Causes**SV:0003**

An error is generated in the following instances:

- When the run/stop parameter is set to stop.
- When the instruction is issued in setup area 1.
- When the ON/OFF control control mode is configured.

SV:0007

An operation error is generated when the initial setup/communications protection is set to "2". The move to setup area 1 is forbidden. When this move is carried out from setup area 0, the display indicates the input type in the initial setting level. When this operation instruction is issued in setup area 1, the display will not change.

SV:0008

This can be accepted only in setup area 0. An operation error is generated when this instruction command is issued in setup area 1. The move to setup area 1 is forbidden.

Address Validation

The following error/warning messages may be generated. Click on the link for a description of the message.

Address Validation

[Missing address](#)

[Device address '<address>' contains a syntax error](#)

[Address '<address>' is out of range for the specified device or register](#)

[Device address '<address>' is not supported by model '<model name>'](#)

[Data Type '<type>' is not valid for device address '<address>'](#)

[Device address '<address>' is read only](#)

Missing address

Error Type:

Warning

Possible Cause:

A tag address that has been specified dynamically has no length.

Solution:

Re-enter the address in the client application.

Device address '<address>' contains a syntax error

Error Type:

Warning

Possible Cause:

A tag address that has been specified dynamically contains one or more invalid characters.

Solution:

Re-enter the address in the client application.

Address '<address>' is out of range for the specified device or register

Error Type:

Warning

Possible Cause:

A tag address that has been specified dynamically references a location that is beyond the range of supported locations for the device.

Solution:

Verify that the address is correct; if it is not, re-enter it in the client application.

Device address '<address>' is not supported by model '<model name>'

Error Type:

Warning

Possible Cause:

A tag address that has been specified dynamically references a location that is valid for the communications protocol but not supported by the target device.

Solution:

Verify that the address is correct; if it is not, re-enter it in the client application. Also verify that the selected model name for the device is correct.

Data Type '<type>' is not valid for device address '<address>'

Error Type:

Warning

Possible Cause:

A tag address that has been specified dynamically has been assigned an invalid data type.

Solution:

Modify the requested data type in the client application.

Device address '<address>' is read only

Error Type:

Warning

Possible Cause:

A tag address that has been specified dynamically has a requested access mode that is not compatible with what the device supports for that address.

Solution:

Change the access mode in the client application.

Serial Communications

The following error/warning messages may be generated. Click on the link for a description of the message.

Serial Communications

[COMn does not exist](#)

[Error opening COMn](#)

[COMn is in use by another application](#)

[Unable to set comm parameters on COMn](#)

[Communications error on '<channel name>' \[<error mask>\]](#)

COMn does not exist

Error Type:

Fatal

Possible Cause:

The specified COM port is not present on the target computer.

Solution:

Verify that the proper COM port has been selected in the Channel Properties.

Error opening COMn

Error Type:

Fatal

Possible Cause:

The specified COM port could not be opened due to an internal hardware or software problem on the target computer.

Solution:

Verify that the COM port is functional and may be accessed by other Windows applications.

COMn is in use by another application

Error Type:

Fatal

Possible Cause:

The serial port assigned to a device is being used by another application.

Solution:

Verify that the correct port has been assigned to the channel.

Unable to set comm parameters on COMn

Error Type:

Fatal

Possible Cause:

The serial parameters for the specified COM port are not valid.

Solution:

Verify the serial parameters and make any necessary changes.

Communications error on '<channel name>' [<error mask>]

Error Type:

Serious

Error Mask Definitions:

B = Hardware break detected.

F = Framing error.

E = I/O error.

O = Character buffer overrun.

R = RX buffer overrun.

P = Received byte parity error.

T = TX buffer full.

Possible Cause:

1. The serial connection between the device and the Host PC is bad.
2. The communication parameters for the serial connection are incorrect.

Solution:

1. Verify the cabling between the PC and the device.
2. Verify that the specified communication parameters match those of the device.

Device Status Messages

The following error/warning messages may be generated. Click on the link for a description of the message.

Device Status Messages

[Device '<device name>' is not responding](#)

[Unable to write to '<address>' on device '<device name>'](#)

Device '<device name>' is not responding

Error Type:

Serious

Possible Cause:

1. The serial connection between the device and the Host PC is broken.
2. The communication parameters for the serial connection are incorrect.
3. The named device may have been assigned an incorrect Network ID.

Solution:

1. Verify the cabling between the PC and the device.
2. Verify that the specified communication parameters match those of the device.
3. Verify that the Network ID given to the named device matches that of the actual device.

Unable to write to '<address>' on device '<device name>'

Error Type:

Serious

Possible Cause:

1. The serial connection between the device and the Host PC is broken.
2. The communication parameters for the serial connection are incorrect.
3. The named device may have been assigned an incorrect Network ID.

Solution:

1. Verify the cabling between the PC and the device.
2. Verify that the specified communication parameters match those of the device.

3. Verify that the Network ID given to the named device matches that of the actual device.

Device Specific Messages

The following error/warning messages may be generated. Click on the link for a description of the message.

Device Specific Messages

[Device '<device name>' responded with error. \(Tag '<tag address>'\)](#)

Device '<device name>' responded with error. (Tag '<tag address>')

Error Type:

Serious

Possible Cause:

1. The connection between the device and the Host PC is intermittent.
2. The communication parameters for the serial connection are incorrect.
3. Value written is out of range or write was performed while in incorrect setup area.

Solution:

1. Verify the cabling between the PC and the device.
2. Verify that the specified communication parameters match those of the device.
3. Look up the meaning of end code and the response code. The most common response code is "1100" (write value is out of range) and "2203" (which has a different meanings depending on the operation that was performed).

See Also:

[Allen-Bradley 900 Error Codes List](#)

Automatic Tag Database Generation Messages

The following error/warning messages may be generated. Click on the link for a description of the message.

Automatic Tag Database Generation Messages

[Unable to generate a tag database for device '<device name>'](#)

Unable to generate a tag database for device '<device name>'

Error Type:

Warning

Possible Cause:

Memory required for database generation could not be allocated. The process is aborted.

Solution:

Close any unused application and/or increase the amount of virtual memory. Then, try again.

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