Driver Manual

# FS-8704-07 Allen Bradley CSP

**APPLICABILITY & EFFECTIVITY**
Effective for all systems manufactured after March 2021.

Driver Revision: 1.00
Document Revision: 12.A

## Contents

# 1   Description

The Allen Bradley CSP (TCP/IP) driver allows the FieldServer to transfer data to and from devices over Allen Bradley CSP Ethernet protocol. The FieldServer can emulate either a Server or Client.

The information that follows describes how to expand upon the factory defaults provided in the configuration files included with the FieldServer.

# 2   Driver Scope of Supply

## 2.1   Supplied by MSA Safety

| Part #     | Description           |
|------------|-----------------------|
| FS-8915-10 | Ethernet cable (7 foot) |
|            | Driver Manual         |

## 2.2   Provided by the Supplier of 3rd Party Equipment

| Part # | Description                                                                                      |
|--------|--------------------------------------------------------------------------------------------------|
|        | Allen Bradley CSP (TCP/IP) compatible PLC (e.g. SLC5/05 etc.) [1]                                 |
|        | Allen Bradley CSP (TCP/IP) Client (e.g. Wonderware, Intellution FIX, GE Cimplicity, etc.) [2]     |

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[1] If FieldServer used as Allen Bradley Allen Bradley CSP (TCP/IP) Client.
[2] If FieldServer used as Allen Bradley Allen Bradley CSP (TCP/IP) Server.

## 3    Hardware Connections

Make sure the device IP_address is configured to be on the same IP network as the FieldServer. Use a crossover cable if the FieldServer is connected directly to the PLC device. Use a straight cable if the FieldServer is connected to a switch.

Configure the PLC according to manufacturer's instructions.
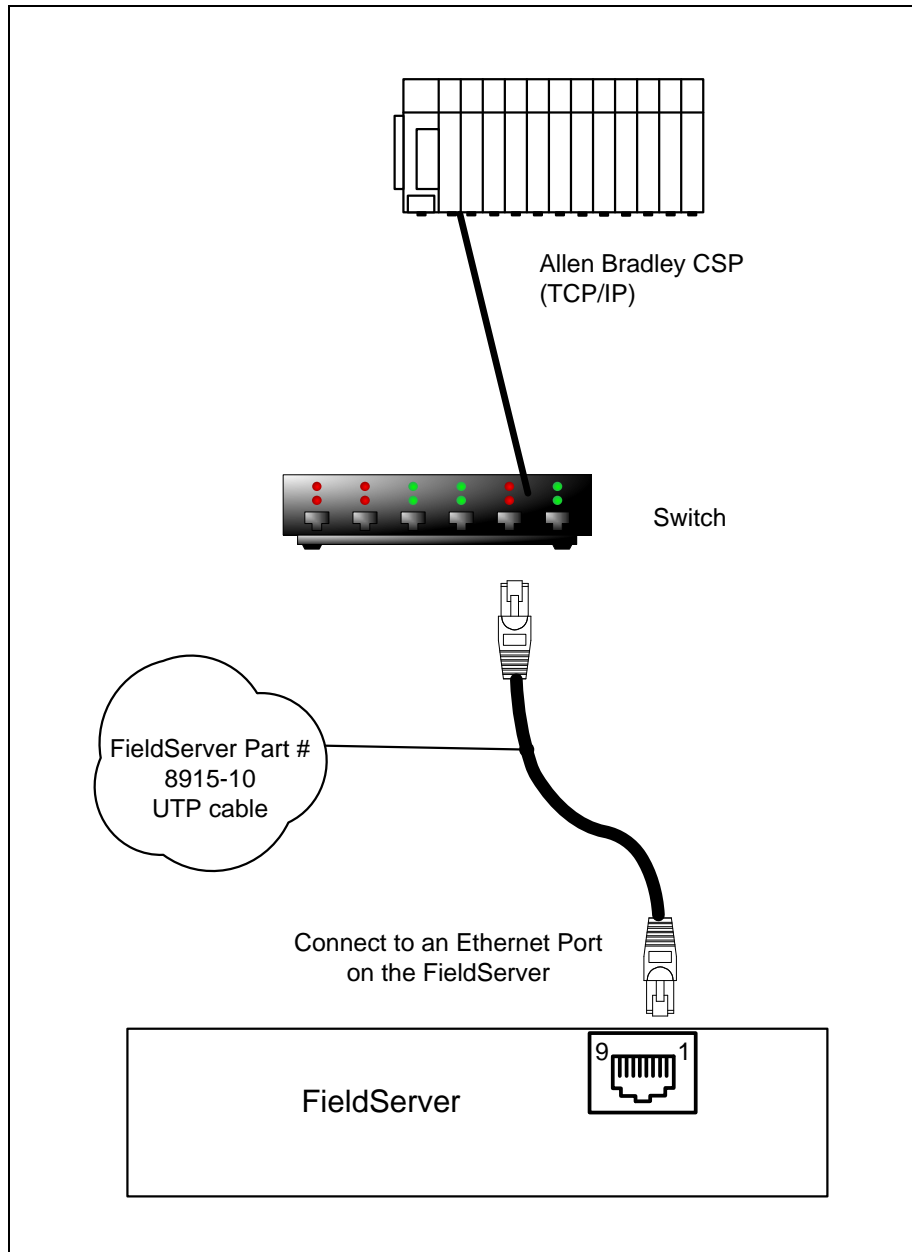
## 4   Data Array Parameters

Data Arrays are "protocol neutral" data buffers for storage of data to be passed between protocols. It is necessary to declare the data format of each of the Data Arrays to facilitate correct storage of the relevant data.

| Section Title | | |
|---|---|---|
| Data_Arrays | | |
| **Column Title** | **Function** | **Legal Values** |
| Data_Array_Name | Provide name for Data Array. | Up to 15 alphanumeric characters |
| Data_Array_Format | Provide data format. Each Data Array can only take on one format. | Float, Bit, Byte, Uint16, Uint32, Sint16, Sint32 |
| Data_Array_Length | Number of Data Objects. Must be larger than the data storage area required by the Map Descriptors for the data being placed in this array. | 1-10000 |

**Example**

```
//   Data Arrays
Data_Arrays
Data_Array_Name    , Data_Array_Format   , Data_Array_Length
DA_AI_01           , Float               , 200
DA_AO_01           , Float6              , 200
DA_DI_01           , Bit                 , 200
DA_DO_01           , Bit                 , 200
```

## 5    Client Side Configuration

For detailed information on FieldServer configuration, refer to the FieldServer Configuration Manual. The information that follows describes how to expand upon the factory defaults provided in the configuration files included with the FieldServer (see ".csv" sample files provided with the FieldServer).

This section documents and describes the parameters necessary for configuring the FieldServer to communicate with an Allen Bradley CSP (TCP/IP) Server.

The configuration file tells the FieldServer about its interfaces, and the routing of data required. In order to enable the FieldServer for Allen Bradley CSP (TCP/IP) communications, the driver independent FieldServer buffers need to be declared in the "Data Arrays" section, the destination device addresses need to be declared in the "Client Side Nodes" section, and the data required from the servers needs to be mapped in the "Client Side Map Descriptors" section. Details on how to do this can be found below.

### 5.1    Client Side Connection Descriptions

| Section Title | | |
|---|---|---|
| Connections | | |
| **Column Title** | **Function** | **Legal Values** |
| Adapter | Specify which port the device is connected to the FieldServer. | N1-N2, WLAN[3] |
| Protocol | Specify protocol used. | AB_CSP, AB_TCP |

**Example**

```
//   Client Side Connections
Connections
Adapter     , Protocol
N1          , AB_CSP
```

### 5.2    Client Side Node Descriptors

| Section Title | | |
|---|---|---|
| Nodes | | |
| **Column Title** | **Function** | **Legal Values** |
| Node_Name | Provide name for Node. | Up to 32 alphanumeric characters |
| Node_ID | Node ID of physical server node (PLC). | 0-255 |
| IP_Address* | IP address of physical server node (PLC). Must be on the same subnet as the server or gateway. | IP address (e.g. 192.168.2.1), **-** |
| Protocol | Specify protocol used. | AB_CSP, AB_TCP |
| Adapter | Specify on which port the device is connected to the FieldServer. | N1-N2, WLAN[3] |
| PLC_Type | Specify PLC Communications type. | PLC3, PLC5, SLC5 |

**Example**

```
//   Client Side Nodes
Nodes
Node_Name     , Node_ID    , Protocol    , PLC_Type    , IP_Address     , Adapter
PLC_01        , 1          , AB_CSP      , SLC5        , 192.168.1.13   , N1
```

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[3] Consult the appropriate Instruction manual for details of the ports available on specific hardware.

## 5.3    Client Side Map Descriptors

### 5.3.1    FieldServer Related Map Descriptor Parameters

| Column Title | Function | Legal Values |
|---|---|---|
| Map_Descriptor_Name | Name of this Map Descriptor. | Up to 32 alphanumeric characters |
| Data_Array_Name | Name of Data Array where data is to be stored in the FieldServer. | One of the Data Array names from "Data Array" section above |
| Data_Array_Offset | Starting location in Data Array. | 0 to maximum specified in "Data Array" section above |
| Function | Function of Client Map Descriptor. | Rdbc, Wrbc, Wrbx |

### 5.3.2    Driver Related Map Descriptor Parameters

| Column Title | Function | Legal Values |
|---|---|---|
| File_Type | File type in PLC. | N, B, F, I, O, S[4] |
| File_Number | File Number in PLC. | 0-65535[5] |
| Address | Starting address of read block. | 0-255 |
| Data_Array_Low_Scale* | Scaling zero in Data Array. | -32767 to 32767, **0** |
| Data_Array_High_Scale* | Scaling max in Data Array. | -32767 to 32767, **100** |
| Node_Low_Scale* | Scaling zero in Connected Node. | -32767 to 32767, **0** |
| Node_High_Scale* | Scaling max in Connected Node. | -32767 to 32767, **100** |
| AB_Command | Override the default command. | Unprotected Command Typed |

## 5.4    Map Descriptor Example

```
//   Client Side Map Descriptors

Map_Descriptors
Map_Descriptor_Name , Data_Array_Name , Data_Array_Offset , Function , Node_Name , File_Type , File_Number , Address , Length , Scan_Interval
CMD_AI_01             , DA_AI_01        , 0                 , Rdbc     , PLC_01    , N         , 10          , 0       , 16     , 1.0s
CMD_AO_01             , DA_AO_01        , 0                 , Rdbc     , PLC_01    , N         , 11          , 0       , 16     , 1.0s

Map_Descriptors
Map_Descriptor_Name , Data_Array_Name , Data_Array_Offset , Function , Node_Name , File_Type , File_Number , Address , Length , Scan_Interval
CMD_DI_01             , DA_DI_01        , 0                 , Rdbc     , PLC_01    , B         , 12          , 0       , 16     , 1.0s
CMD_DO_01             , DA_DO_01        , 0                 , Rdbc     , PLC_01    , B         , 13          , 0       , 16     , 1.0s
```

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[4] Not all PLC's can support all File_Types. Refer to DFS for further information.
[5] Other device might not be supporting the full range, e.g. SLC5 supports only 0-255 and latest PLC5 till now supports only 0-1999.

## 6    Server Side Configuration

**NOTE:  In the tables below, \* indicates an optional parameter with the bold legal value as default.**

### 6.1    Server Side Connection Parameters

| Section Title | | |
|---|---|---|
| Connections | | |
| **Column Title** | **Function** | **Legal Values** |
| Adapter | Specify which port the device is connected to the FieldServer. | N1-N2, WLAN[6] |
| Protocol | Specify protocol used. | AB_CSP, AB_TCP |
| IP_Address\* | Virtual IP address of FieldServer. Must be on the same subnet as the Cient or Gateway. | IP Address (e.g. 192.168.2.1), **-** |

**Example**

```
//   Server Side Connections
Connections
Adapter          , Protocol    , IP_address
N1               , AB_CSP      , 192.168.2.1
```

### 6.2    Server Side Node Parameters

| Section Title | | |
|---|---|---|
| Nodes | | |
| **Column Title** | **Function** | **Legal Values** |
| Node_Name | Provide name for node. | Up to 32 alphanumeric characters |
| Node_ID | Node ID of physical server node. | 0-255 |
| Protocol | Specify protocol used. | AB_CSP, AB_TCP |
| PLC_Type | Specify PLC Communications type. | PLC3, PLC5, SLC5 |

**Example**

```
//   Server Side Nodes
Nodes
Node_Name              , Node_ID    , Protocol    , PLC_Type
ABE_Srv_11             , 11         , AB_CSP      , SLC5
```

### 6.3    Server Side Map Descriptor Parameters

#### 6.3.1    FieldServer Specific Map Descriptor Parameters

| **Column Title** | **Function** | **Legal Values** |
|---|---|---|
| Map_Descriptor_Name | Name of this Map Descriptor. | Up to 32 alphanumeric characters |
| Data_Array_Name | Name of Data Array where data is to be stored in the FieldServer. | One of the Data Array names from "Data Array" section above |
| Data_Array_Offset | Starting location in Data Array. | 0 to (Data_Array_Length-1) as specified in "Data_Array" section |
| Function | Function of Client Map Descriptor. | Passive |

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[6] Consult the appropriate Instruction manual for details of the ports available on specific hardware.

### 6.3.2  Driver Specific Map Descriptor Parameters

| Column Title | Function | Legal Values |
|---|---|---|
| Node_Name | Name of Node to which data has to be sent. | One of the Node names specified in the Server "Node" section above |
| File_Type | File type in PLC. | N, B, F, I, O, S[7] |
| File_Number | File Number in PLC. | 0-65535[8] |
| Address | Starting address of read block. | 0 - 255 |
| Data_Array_Low_Scale* | Scaling zero in Data Array. | -32767 to 32767, **0** |
| Data_Array_High_Scale* | Scaling max in Data Array. | -32767 to 32767, **100** |
| Node_Low_Scale* | Scaling zero in Connected Node. | -32767 to 32767, **0** |
| Node_High_Scale* | Scaling max in Connected Node. | -32767 to 32767, **100** |

## 6.4  Map Descriptor Example

```
//   Client Side Map descriptors

Map_Descriptors
Map_Descriptor_Name , Data_Array_Name , Data_Array_Offset , Function , Node_Name , File_Type , File_Number , Address
SMD_AI_01            , DA_AI_01        , 0                 , Passive  , ABE_Srv_11 , N         , 10          , 0
SMD_AO_01            , DA_AO_01        , 0                 , Passive  , ABE_Srv_11 , N         , 11          , 0
```

```
, Length    , Data_Array_Low_Scale    , Data_Array_High_Scale    , Node_Low_Scale    , Node_High_Scale
, 16         , 0                       , 100                      , 0                 , 100
, 16         , 0                       , 100                      , 0                 , 100
```

```
Map_Descriptors
Map_Descriptor_Name , Data_Array_Name, Data_Array_Offset, Function, Node_Name , File_Type, File_Number, Address, Length
SMD_DI_01            , DA_DI_01       , 0                , Passive , ABE_Srv_11, B         , 12         , 0      , 16
SMD_DO_01            , DA_DO_01       , 0                , Passive , ABE_Srv_11, B         , 13         , 0      , 16
```

```
SMD_DO_01, DA_DO_01, 0, Passive, ABE_Srv_11, B, 13, 0, 16
```

---

[7] Not all PLC's can support all File_Types. Refer to DFS for further information.
[8] Other device might not be supporting the full range, e.g. SLC5 supports only 0-255 and latest PLC5 till now supports only 0-1999.

# 7    Troubleshooting

## 7.1    Continuous Map Descriptors

The Driver is not able to split data between 2 Data Arrays when writing, or to read a Server mapping that is discontinuous.

For example, if on the Server Side:
Server map 1:  N21: 0-31
Server map 2:  N21: 32-100

This will panic the FieldServer and crash RS view as the DH+ will attempt to map N21: 0-100. If set up as Server Map 1: N21: 0-100, no problems are experienced.

## 7.2    Reading B File Types

It is advisable to read all data from one B type file into the same data array in one contiguous read if possible. Doing otherwise may result in problems when reading these points.

## 7.3    Station Address

AB Message block does not allow for setting of Station address, therefore Node_ID must be set to 0.

## 7.4    Unable to Create Cache Block

When the AB_CSP driver is polled for a datapoint but the map_descriptor does not exist, the driver will print a message of the following type:

Could not create cache block
         Node:11 Plc_Type:SLC5 File:N7 Nrm_Addr:10 len:16


**Solution:**  Either add a map descriptor for the specific data point or remove polling for this point from the remote client.

## 8    Vendor Information

### 8.1    Set up of FieldServer in RS Linx

- Run up rslinx.

- Click Communications->Configure Drivers.

- Select Ethernet Devices (from the "Available Driver Types" pulldown).

- Select "Add New".

- Select the station with which to talk. Press "Add New" button and "a".

- A new Driver called "AB_ETH-1 A-B Ethernet" is added as a station number.

- Close the "Configure Devices" window.

- Press "Display Station Browser" icon.

- See that the device is discovered.

Task Complete

## 9    Reference

### 9.1    Command Support

The following commands are supported by the FieldServer for the various PLC types:

| PLC_Type | File_Type | FNC | Read | FNC | Write | Typical Command |
|----------|-----------|-----|------|-----|-------|-----------------|
| PLC3 | N | 1 | Range Read | 0 | Range Write | N7: 3, L5 |
| | F | 1 | Range Read | 0 | Range Write | F12: 3, L5 |
| | B | 1 | Range Read | 2 | Bit Write | B3/4: 5, I5 |
| PLC5 | N | 1 | Range Read | 0 | Range Write | N7: 3, L5 |
| | F | 1 | Range Read | 67 | Typed Write | F12: 3, L5 |
| | B | 1 | Range Read | 26 | Read Modify Write | B3/4: 5, L5 |
| SLC5 | N | A2 | Protected Typed Logical Read | AA | Protected Typed Logical Write | N7: 3, L5 |
| | F | A2 | Protected Typed Logical Read | AA | Protected Typed Logical Write | B3/4: 5, L7 |
| | B | A2 | Protected Typed Logical Read | AB | Protected Typed Logical Write | B3/4: 5, L8 |
| | I | A2 | Protected Typed Logical Read | - | - | I: 13, L5 |
| | O | A2 | Protected Typed Logical Read | - | - | O: 13, L5 |
| | S | A2 | Protected Typed Logical Read | | | 52: 3, L5 |

### 9.2    Error Messages

| Error Message | Description and Action |
|---------------|------------------------|
| AB_TCP:#1 Err. Cant connect to %s. Recovery_Interval begins. | This message is printed if the driver cannot open a TCP connection to the remote Node. In this case the Node is put offline immediacy and the recovery_interval (default 30 seconds) begins. This message is typically printed when the remote AB_TCP node is not connected to the network or is unreachable. |