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SuiteFactory Technote

Document and Records Mangement   Job Packets
DNC   Wired and Wireless Ethernet Networks
Wired and Wireless RS-232   Consulting Services

CNC Communications Setup RS-232 or Networked Ethernet Fanuc 16/18/20/21/31i/32i/0i

Valid for SuiteFactory V7.3.180 and up

Please note! The following information comes from our many years of experience in setting up RS-232 and Ethernet communications with CNC's. However, our experience also has taught us that many times same model CNC's differing from each other. So, please double-check this information in the Operator or Maintenance or Parameter manual that came with your machine.

1   RS-232 Settings

1.1   CNC Setup

1. Put the CNC in MDI mode or emergency stop state.
2. Select the Setting (Handy) screen by pressing the Setting button and/or the Setting soft key.

    Set TV check to OFF
    Set Punch code to ISO
    Set I/O channel to 0 (same as setting parameter 20)

3. To change parameter values, set Parameter Write Enable to 1 by moving the cursor to the Parameter Write line, pressing the OPRT soft key, then pressing the ON:1 soft key or entering 1 then pressing the Input soft key. To change parameter values enter the data and then press the Input soft key.
    (Parameter bits not related to RS-232 communications are represented by an "x" and should not be changed.)

    If 0020=0 (physical port 1)
    0101=1xxx0xx1 (Do not output feed holes, use ISO, 2 stop bits
    0102=0   (Use DC codes)
    0103=11   (9600 baud)

1.2   DNC Parameters

Set the SuiteFactory machine properties as follows:

The protocol is Generic RS-232, the Data Type is ASCII.

Communication settings are as follows:
Sending: 9600, 7 bits, Even, 2 stop bits, XON/XOFF Wait. Receiving 9600, 7 bits, Even, 1 stop bit, XON/XOFF Wait.
If you use the Remote Request feature for requesting files from your CNC control panel see Remote Request Technotes.

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1.3 Wiring – there are 2 possibilities – 9 pin or 25 pin COM port

Use CCI's Modular SuiteCable or 24 AWG stranded, low capacitance computer cable with an overall shield (foil is fine and easier to work with.)

CNC   **DNC COM port**

(25 pin plug)   **(9 pin socket)**   **OR**   **(25 pin socket)**

```
1-------------------------shield ----------------shield
2--------------------------2 ------------------3
3--------------------------3 ------------------2
4--------------------------8 ------------------5
5--------------------------7 ------------------4
7--------------------------5 ------------------7
6 ------|
8 ------|
20 -----|
```

1.4 Sending and Receiving DNC Files

Please note – for a multi-headed machine you must select which head for which you are transmitting a part program. Press CHANGE to select the head before continuing.

1.4.1 To Get a File from the SuiteDNC database and transmit it to the Fanuc CNC

- Login to SuiteFactory Runtime and queue up the file to be sent*. If you have Remote Request enabled send the dummy file with the GET command in it to SuiteFactory and then get the file as described just below.*

- At the CNC, select EDIT mode.
  Press PROG then soft keys OPRT → I/O → F INPUT → EXEC (use right arrow button to find the required soft key if necessary).

1.4.2 To Send a File from the Fanuc CNC to the SuiteDNC database

- Login to SuiteFactory Runtime and queue up the file to be received by entering a unique file name and clicking RECEIVE*. If you have Remote Request enabled and a SAVE command comment embedded in your part program, just send it as described in the next paragraph. Then get the response file (usually O2222) for confirmation.*

- At the CNC, select EDIT mode.
  Press PROG then soft keys OPRT → I/O → F OUTPUT → EXEC (use right arrow button to find the required soft key if necessary).

2   Networked (Ethernet) Setup

Fanuc CNC's with Ethernet capability have 2 or sometimes 3 different Ethernet ports that might or might not be present: Embedded, PMCIA and ETHER BOARD. This document describes using the Fanuc CNC's embedded Ethernet port using the FTP file transfer method. That requires a Host Computer with a static IP address running an FTP service. See Appendix for details on setting up an FTP service. Also, each Ethernet CNC requires a static IP address in the same subnet of the Host Computer to be assigned.

There might some instance where one of the other ports must be used. The settings requirements for those are the same as for the Embedded port except if you select ETHER BOARD the menu will have the selection DATA SERVER instead of FTPTRNS.

2.1   Setting Parameters related to Ethernet I/O

The instructions in this paragraph are generic to pretty much all Fanuc CNC's with Ethernet capability.

However, there are some differences to how you get to the necessary setting screens. See the sub-paragraphs below.

Press SYSTEM then press the right arrow or continue button until you find the EMBED or sometime EMBEDD soft key. Press EMBED to get the COMMON FTPTRNS menu.
PRESS COMMON
Set the IP address, subnet mask and gateway IP address if required.
For example:
10.3.20.16
255.255.255.0
10.3.20.1 (or 0.0.0.0 if not needed)

Press the left arrow or back button to get back to the COMMON FTPTRNS menu page if necessary. Then press FTPTRNS

You can configure up to 3 different Hosts. Only one is required for the newer CNC's where you can switch between FTP folders on the host. The 18i does not allow this so to work around it, we set up 3 hosts. See paragraph 2.2.1 below.

Select HOST1.
Set the Host Name to the IP address of the Host Computer.
Set the User Name to the user for this kind of machine that you set up on the FTP Service on the Host Computer. See Appendix.
For example:
Host Name: 10.3.20.10
Port: 21
User Name: FTPUSR2
Password: 12345
Login Folder: / (this will default to the Home Directory configured in the FTP Service on the Host Computer.)

2.1.1 Fanuc 18I

Press SYSTEM then the right arrow or continue "+" button until you see ETHPRM. Select ETHPRM then (OPRT) to get to the menu item EMBEDD. Setup is the same as above but you will also setup HOST2 with the Login Folder set to /SAVE and HOST3 with the Login Folder set to /GET. All the other parameters are the same.

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2.1.2 Fanuc Professional 5 (Makino)

The Fanuc Professional 5 is a Window CE base controller with proprietary machine builder's software as a front end. It also has a touch screen. However you can get to the usual Fanuc screen by pressing the FLOATING button then the F button or Windows START → Programs → [F]CNC Screen Display. The rest is the same as above. Make sure that you always use the Embedded port.

Setting up SuiteFactory for the Networked CNC

This CNC's Ethernet communications uses the FTP service to transfer files. FTP works by copying files either from a designated folder on the Host Computer to the CNC memory or from the CNC memory to a designated folder on the Host Computer. The configuration of the shared folders is done on the Host Computer when setting up the FTP service. See Appendix.
CCI suggests the following configuration on the Host Computer:

Login to SuiteFactory as administrator. At the main toolbar, click on Machines or select Configure/Machines. If this is a new machine, select New.
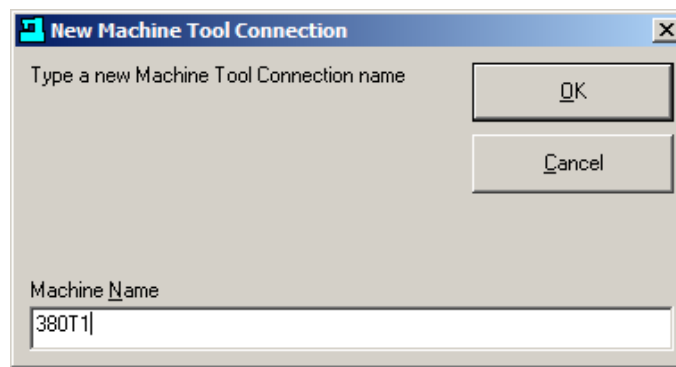
Enter the Machine's name - for example, 380T1. Click OK. If not new, select the machine from the tree and click Properties. Now select the Protocol tab. Change both send and receive protocol to Networked Controller UNC.

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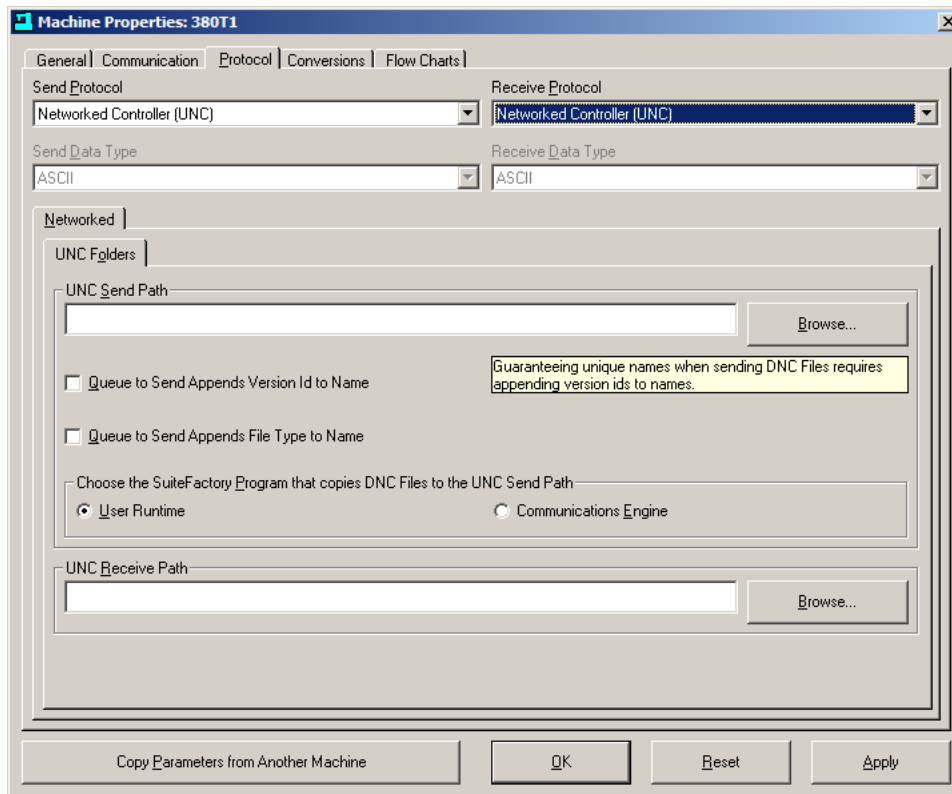
For both the UNC Send Path and UNC Receive Path click Browse and navigate to the path to the shared folder on the Host Computer
.
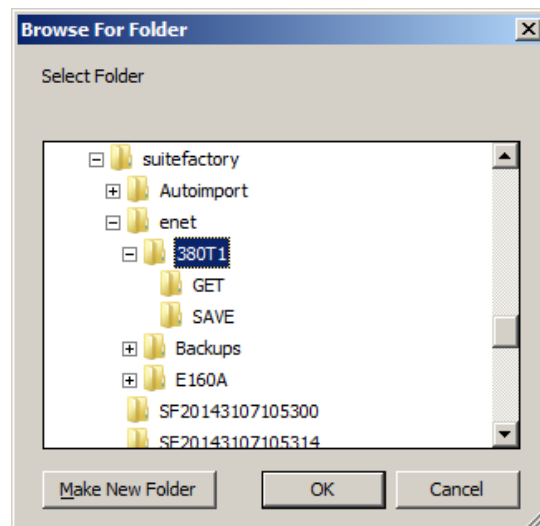
Click OK. For the UNC Send path, select 380T1 in this example, and for the Receive path select 380T1 also. **Note – In this version of SuiteFactory DNC files placed in the SAVE folder by the CNC operator will automatically be input into the SuiteFactory database.**

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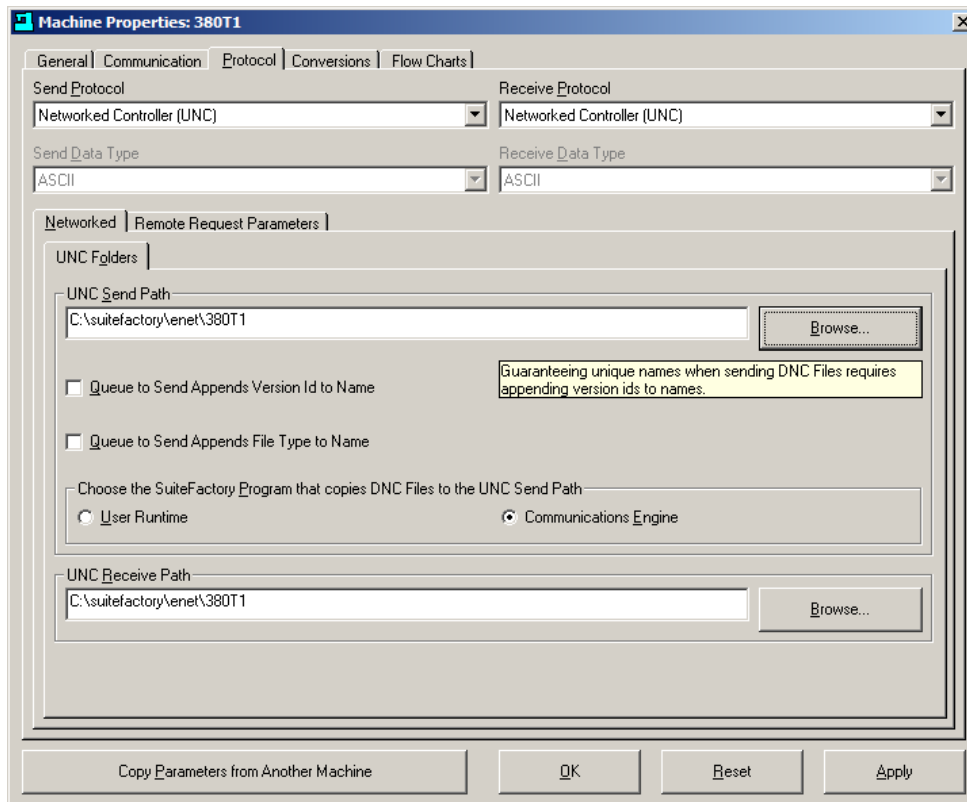
Select "Queue to Send Appends Version Id to Name" if you have are set up as a multi-version system and you want to differentiate between versions sent to the CNC.

Select "Queue to Send Appends File Type to Name" if the CNC requires a specific .ext. You can change the file type in the "Manage DNC Files" window.

Select "Communications Engine" if you use SuiteFactory's Remote Request feature from your CNC control panel. Then go to the General tab and select the Communications Engine location.

Select "User Runtime" if you only send and receive DNC files manually at a shop floor workstation. (THIS SETTING IS RARELY USED.)

Select the Remote Request Parameters tab and make sure that the Auto-Save Files from the "Save" sub-folder is selected.
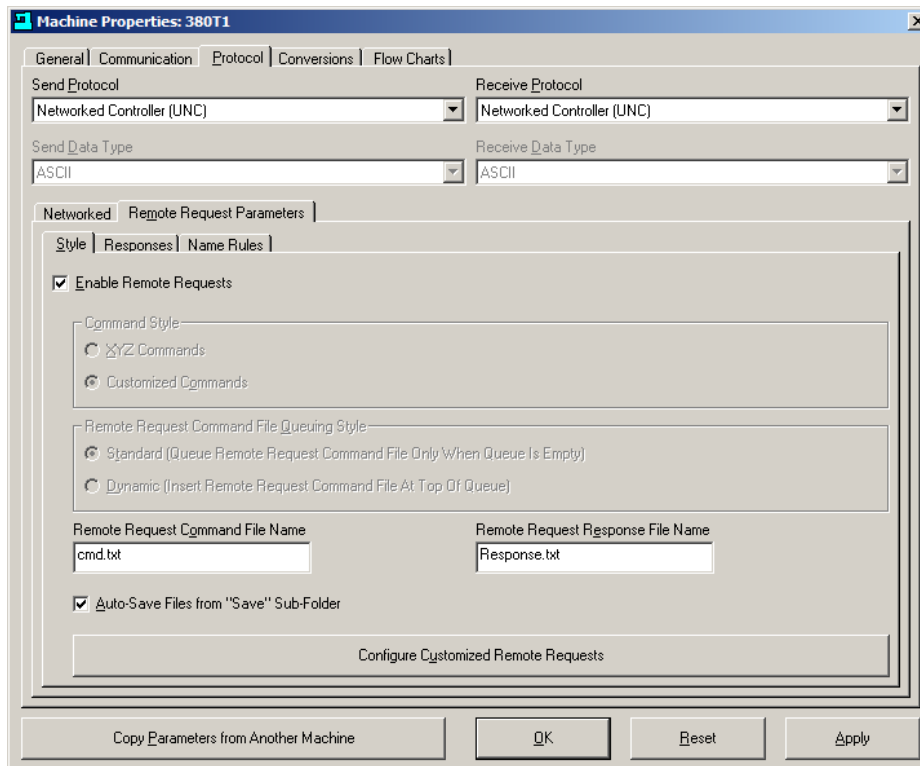
2.2 Sending and Receiving Programs with the Ethernet Feature

Make sure that on the Setting (Handy) screen the I/O Channel is set to 9. If you have to change it you will have to be in MDI mode.

The instructions in this section are generic to pretty much all Fanuc CNC's with Ethernet capability. Set the CNC to EDIT mode.

However, there are some differences to how you get to the necessary screens. See the sub-paragraphs, below.

In order to send and receive files you will have to know how to point to one of several file sources or destinations:
1. *CNC MEMORY where the files are stored for running on the machine.*
2. *EMBED ETHERNET home or upper folder on the CNC where DNC files are transferred from or to CNC MEMORY.*
3. *EMBED ETHERNET GET folder on the DNC server where you can put an empty file whose name is the same as the file stored in the SuiteFactory database that you wish to get from the DNC database and store in the CNC MEMORY.*
4. *EMBED ETHERNET SAVE folder on the DNC server where, if you put a file from CNC MEMORY that you want to save in the SuiteFactory database, it will automatically be imported. If the file to be saved includes a comment line, "(SAVE file_name)" it will be saved under that file_name, where file_name can be anything you'd like. If it does not include that comment line, it will be saved under the name of the file itself. A response file will be sent to the EMBED ETHERNET home folder on the CNC.*

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2.2.1 Point to CNC MEMORY

Press PROGRAM then DIR or FOLDER (if necessary) → OPRT→ → CHANGE-DEVICE and select CNC MEMORY

2.2.2 Point to EMBED ETHERNET Home (or Upper) Folder or GET or SAVE Folder

Press PROGRAM then DIR or FOLDER (if necessary) → (OPRT)→ → CHANGE-DEVICE and select EMBED-ETHER. The resulting view will show you which folder you're pointing to. Select the folder you want. Note the Fanuc 18i does not allow changing folders. See paragraph, below, with instructions for the Fanuc 18i.

2.2.3 To get a program from the DNC

There are 3 ways to get a DNC file from the SuiteFactory database:

1. **Send the file manually from SuiteFactory Runtime at any workstation running SuiteFactory**.
   - At a DNC computer, queue up the program you want to send to the CNC. If you have the right you can use SuiteFactory's filter function to create a list of files you wish to send. Click Send to send one file. Click Send All Listed DNC Files to send all the files in the list. Copies of the file(s) will be sent to the folder configured for the machine.
   - At the CNC point to the ETHERNET EMBED home (or upper) folder. You will see the file or files that were sent from the SuiteFactory database. See paragraph 2.2.2, above.
   - Press (OPRT) → to get to the F INPUT F OUTPUT or the READ PUNCH menu.
   - Press F INPUT or READ. Select the program from the list. Type in the file name (O####) or #### O SET or file_name or F GET if not O numbers. The file name should appear in the A> field.
   - Press EXEC. The selected file will be sent to CNC memory.

2. **Remote Request from the CNC control panel using a command file.**

   - Create/edit a command file in CNC memory with the name configured in the SuiteFactory Remote Request parameters. It might be called CMD.TXT or O1111 for example. With the CNC editor insert the command line (GET file_name)EOB.
   - At the CNC point to the ETHERNET EMBED home (or upper) folder. See paragraph 2.2.2, above.
   - Point to CNC MEMORY. See paragraph 2.2.1, above.
   - Press OPRT → to get to the F INPUT F OUTPUT or the READ PUNCH menu.
   - Press F OUTPUT or PUNCH. Select the command file you created. Type in the file name (O####) or #### O SET if and O number or highlight the program using the arrow keys and press P GET
   - Press EXEC.
   - Once sent, SuiteFactory will read the command file and send the requested DNC file to the same folder. If there is some problem with your request such as the file does not exist or it is not assigned for your machine, you will see a response file appear in that folder with the reason why.
   - Get the file from the shared folder and put it into CNC MEMORY. See 2.2.3.1, below.

3. **Remote Request from the CNC control panel using the EMBED ETHERNET GET folder.**
   - Point to the GET folder. See 2.2.2.
   - Point to CNC MEMORY. See 2.2.1.

- Create an empty file whose name is the name of the file you want from the SuiteFactory database. ***Note – This is the file name as listed in the SuiteFactory DNC File database, not the O number unless the DNC file was named the same as the O number.***
- Send that empty file to the GET folder. Press (OPRT) → to get to the F INPUT F OUTPUT or the READ PUNCH menu.
- Press F OUTPUT or PUNCH. Select the empty file CNC MEMORY. Highlight the empty program and press F GET then F SET.
- Press EXEC. The empty file is sent to the GET folder. SuiteFactory will automatically send the requested file to the home folder. If there is a problem, a response file will be sent instead with a reason. Continue to 2.2.3.1.

2.2.3.1 Get a File from the SuiteFactory Shared Folder and put it into CNC memory

- Point to the EMBED ETHERNET home folder. See 2.2.2. At this point you should see a list of files stored in the home directory for this machine on the Host Computer.
- Press (OPRT) → to get to the F INPUT F OUTPUT or the READ PUNCH menu.
- Press F INPUT or READ. Highlight the program from the list. Press P GET then P SET then EXEC. The selected file will be sent to CNC memory.

2.2.3.2 Send a File from CNC Memory to the SuiteFactory Shared Folder

- In EDIT mode. Make sure the CNC is pointing to the home directory (upper folder) for this machine. Press PROGRAM then DIR or FOLDER (if necessary) → OPRT→ → CHANGE-DEVICE and select EMBED-ETHER. At this point you should be viewing the home directory. If you are in SAVE or GET select the upper folder.
- Return to the CNC MEMORY. Press PROGRAM then DIR or FOLDER (if necessary) → OPRT→ → CHANGE-DEVICE and select CNC MEMORY. Press OPRT → to get to the F INPUT F OUTPUT or the READ PUNCH menu.
- Press F OUTPUT or PUNCH. Select a program in the Host Computer. Type in the file name (O####) then P SET or highlight the program and press P GET then P SET.
- Press EXEC.

2.2.4 To send a program to save in the DNC database

- Point to the SAVE folder. See 2.2.2.
- Point to the CNC MEMORY folder. See 2.2.1.
- Press soft key OPRT → to get to the READ PUNCH or F INPUT F OUTPUT menu
- Press soft key F OUTPUT or Punch
- Select a program in the CNC. Type in the program O#### to be output or #### O SET or P GET then P SET. Press EXEC. SuiteFactory will automatically import that file into the DNC database and send a response file with confirmation.

2.2.4.1 Fanuc 18i

The 18i does not allow changing to the SAVE or GET folders. To get there press PROG → DIR → "+" → CONECT → (OPRT) → EMBEDD → CON-2 for SAVE or CON-3 for GET.
Then to save a file PROG → DIR → type the O#### → "+" → PUNCH → EXEC
SuiteFactory will automatically import that file into the DNC database and send a response file to the home folder with confirmation.

2.2.4.2 Fanuc 30i on Parpas Machines

Note that some of the soft keys appear in a vertical strip at the right side of the screen instead of at the bottom. Use the NEXT PAGE get etc. to navigate.

2.2.4.3 Appendix

Setting up the FileZilla FTP Service

- On your Host Computer, download the free FileZilla FTP Service software (this is the link as of the day this document was written. It might be different when you need it.) https://filezilla-project.org/download.php?show_all=1&type=server
- Install the FileZilla FTP Service using all the default values (unless you know what you are doing and wish to change any.)
- On your Host Computer, configure the folders that are to be used to communicate to and from the CNC's on the shop floor. CCI suggests the following: The names shown are for illustration and can be any names you want.
    - Create a folder C:\suitefactory\enet
    - Inside the enet folder create a sub-folder for each machine type – that is each type of machine that will be using the same part programs.
    - Inside each of those folders create a sub-folder called SAVE.   We will use these SAVE folders for getting part program files from the CNC to the SuiteFactory database. For the sake of illustration, the folders created inside the enet folder are called 380T1 38T1\SAVE, E160A and E160A\SAVE.
- Start the FileZilla Server Interface

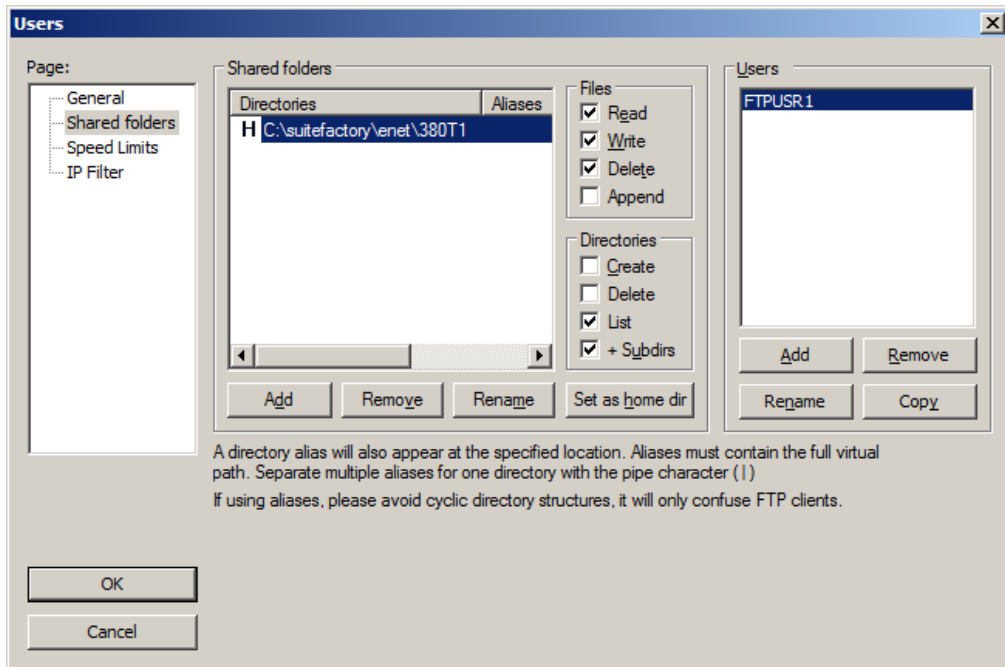A screen similar to this should appear.
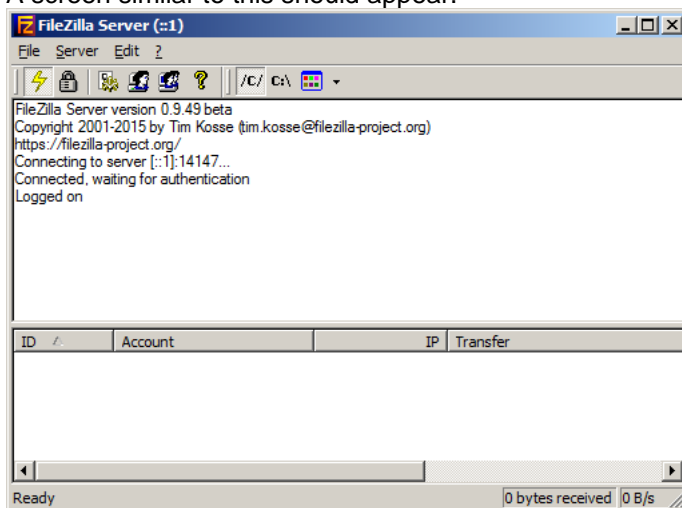
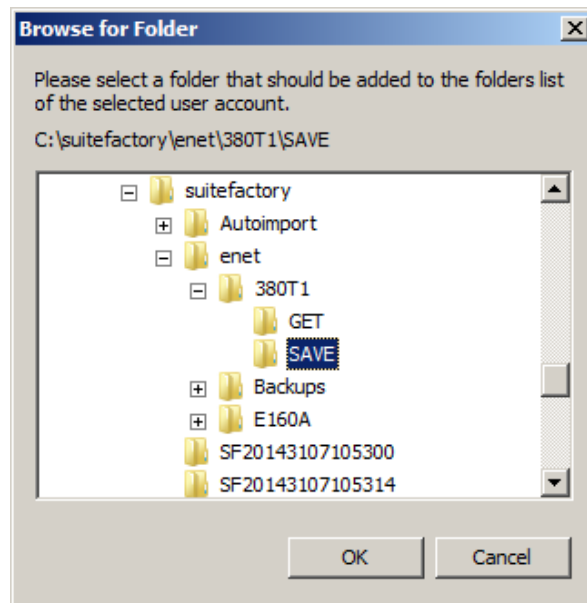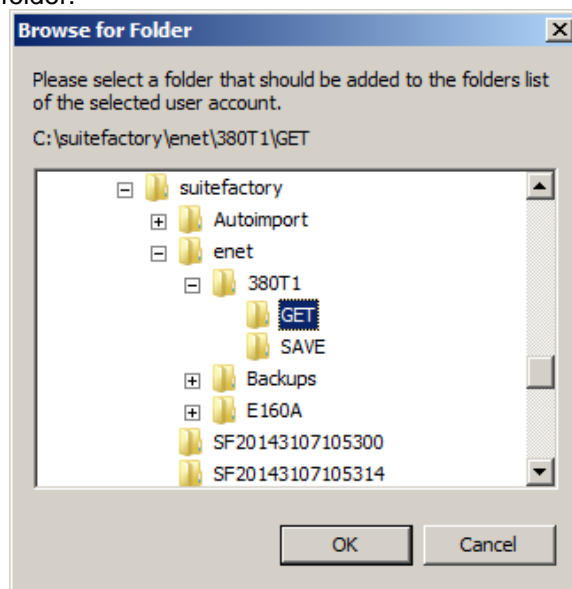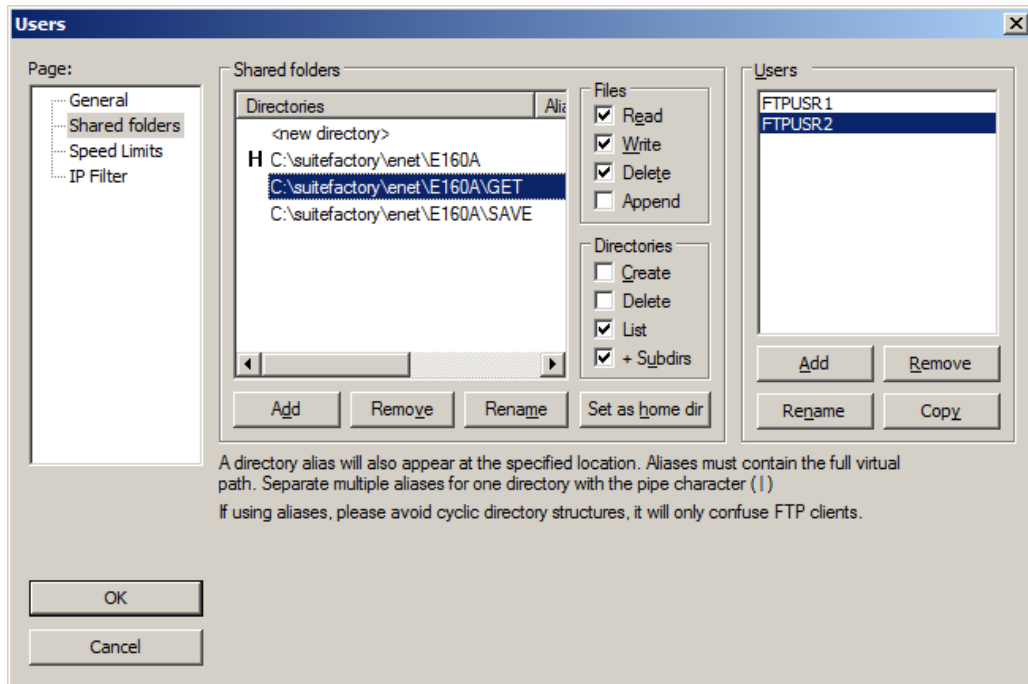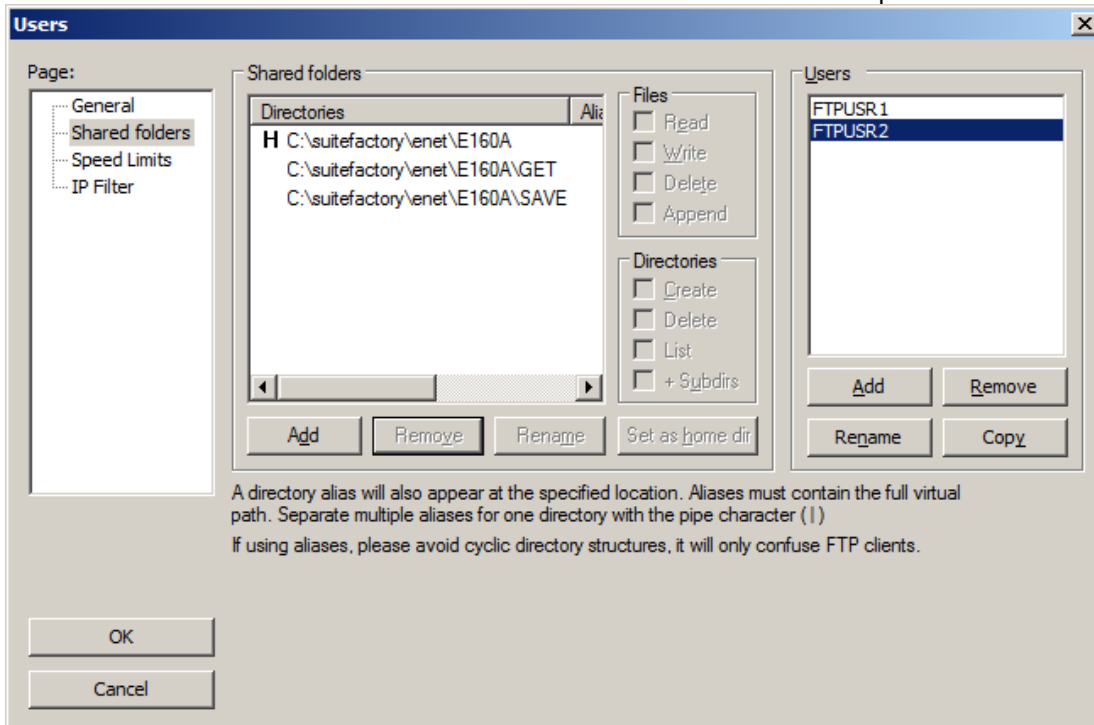If this dialog box appears, click OK without changing anything.
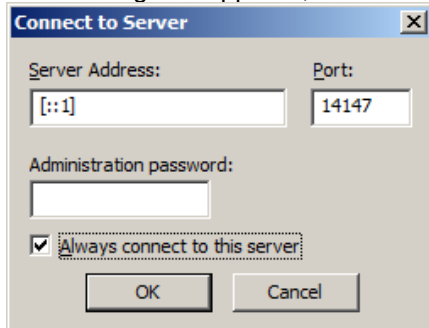
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Click on the Settings icon or Edit/Settings
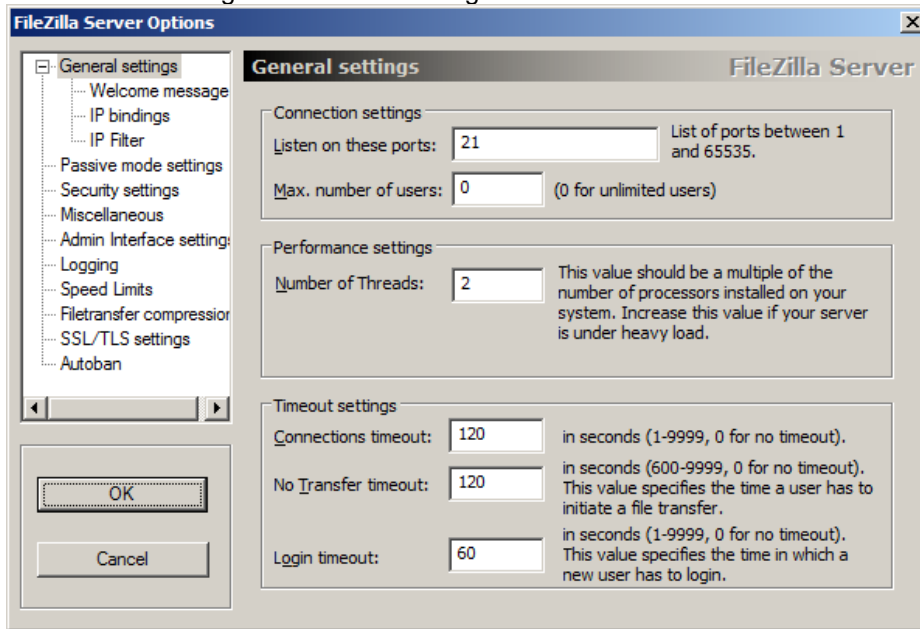
In the General settings screen the "Listen on these ports:" should be 21. Click OK or Cancel if no changes were made.
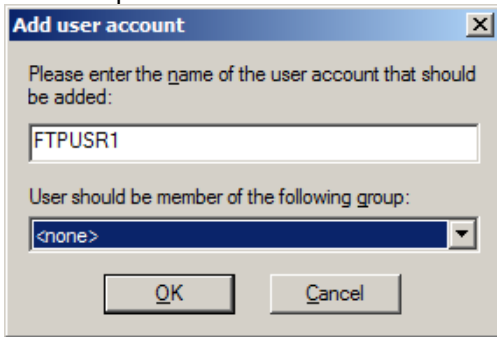
Click on the Users icon or Edit/Users
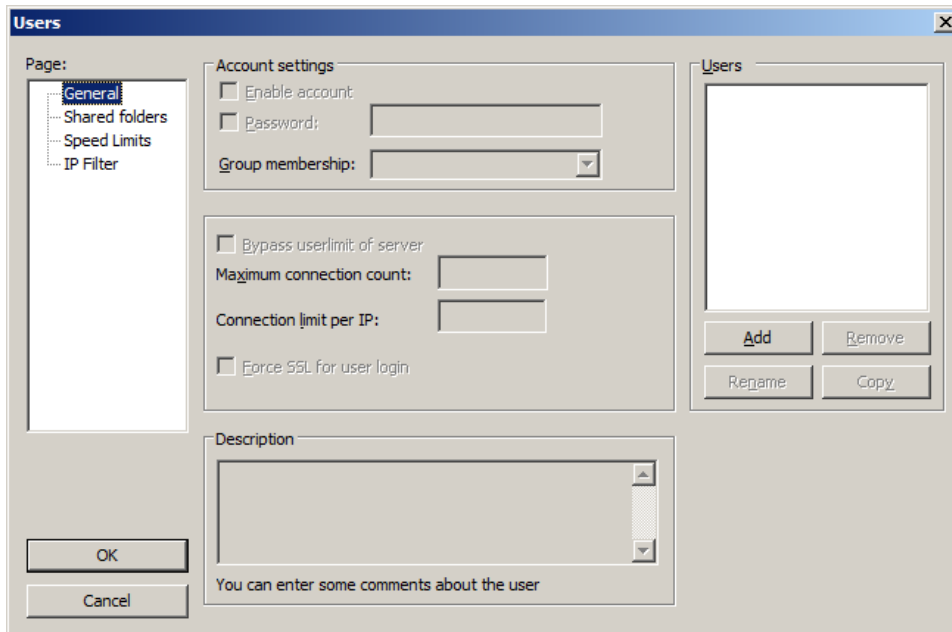
Click Add and create a user.
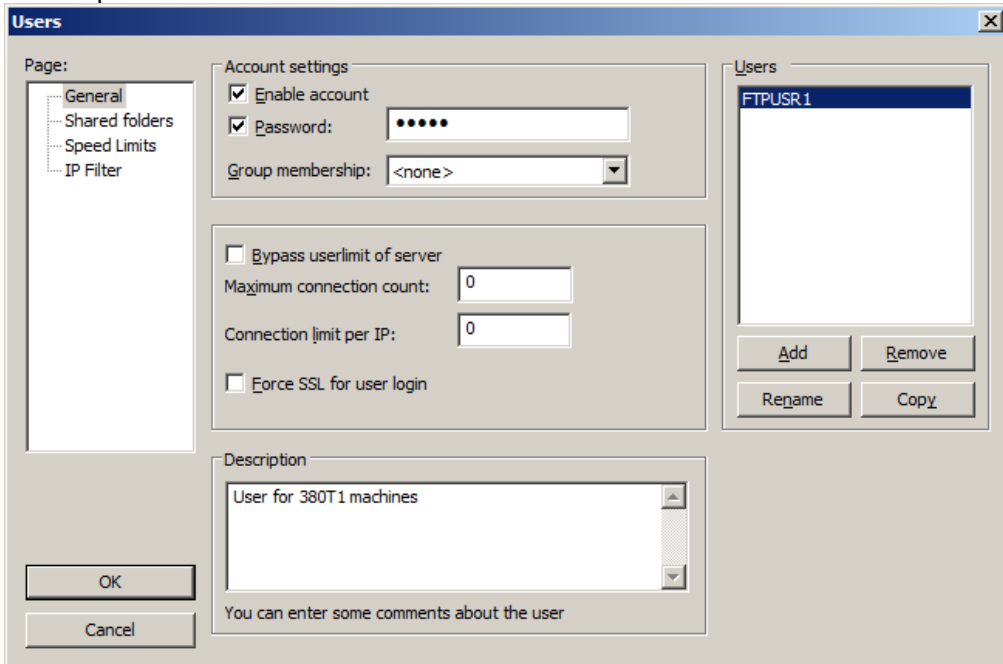
For example FTPUSR1.

Click OK.

Checkmark Enable account and Password. Create a password for FTPUSR1. If you wish enter a description.

Highlight Shared folders.

Click on the Add button under the Shared folders box.
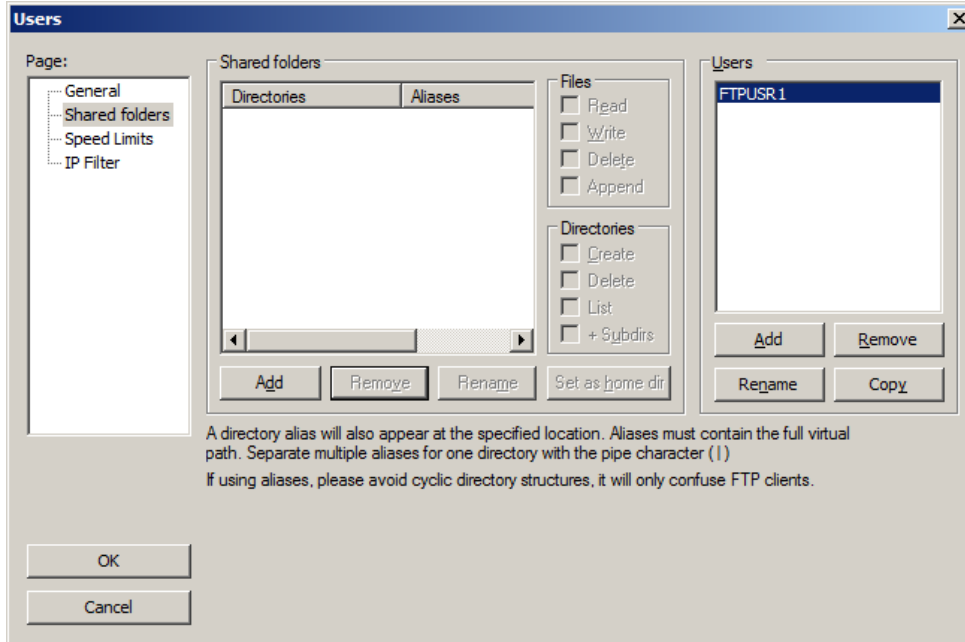
Browse to the 380T1 folder.
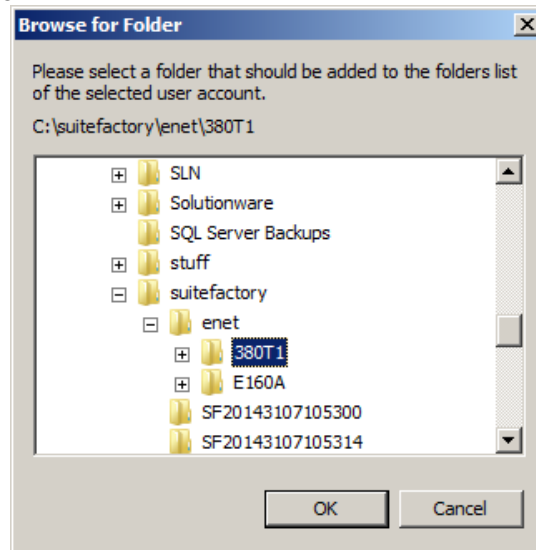
Click OK.

Make sure that under Files that Read, Write and Delete are checked.
Click OK. Note the letter H to the left of the path. That indicates the users Home Directory.

Return to the Shared folders screen (as shown above) and click on the Add button again.

Browse to the SAVE folder for machine 380T1

Click OK.
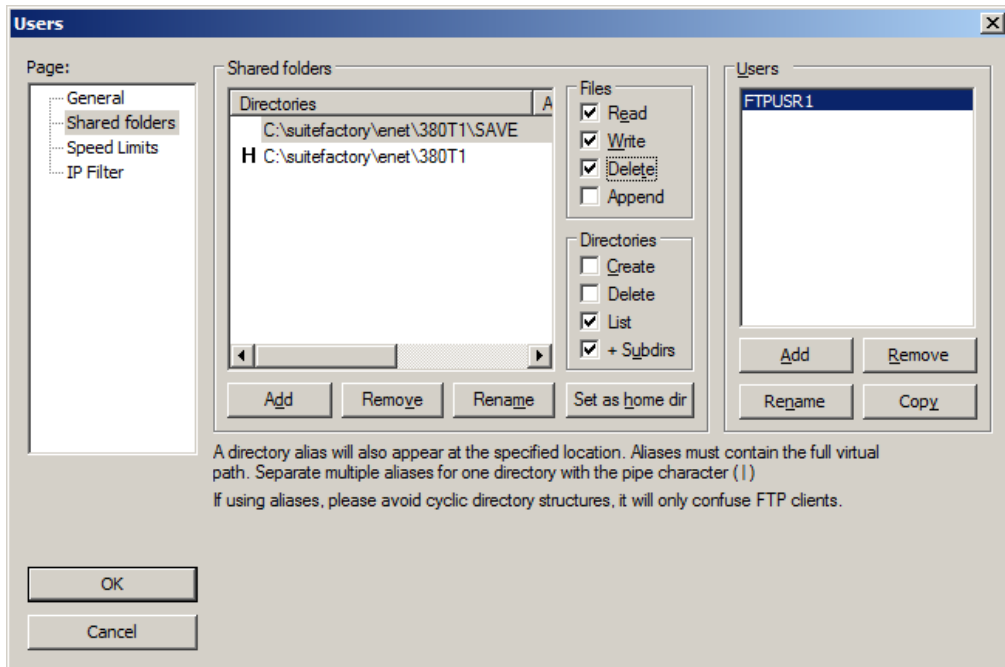
Check Read, Write and Delete and click OK.

Repeat to add the GET folder.

Click OK.

Check Read, Write and Delete and click OK.

Repeat the process for as many users you require for the different kinds of machines you have.
Go back to General and create another user such as FTPUSR2 in this example.

Click OK.
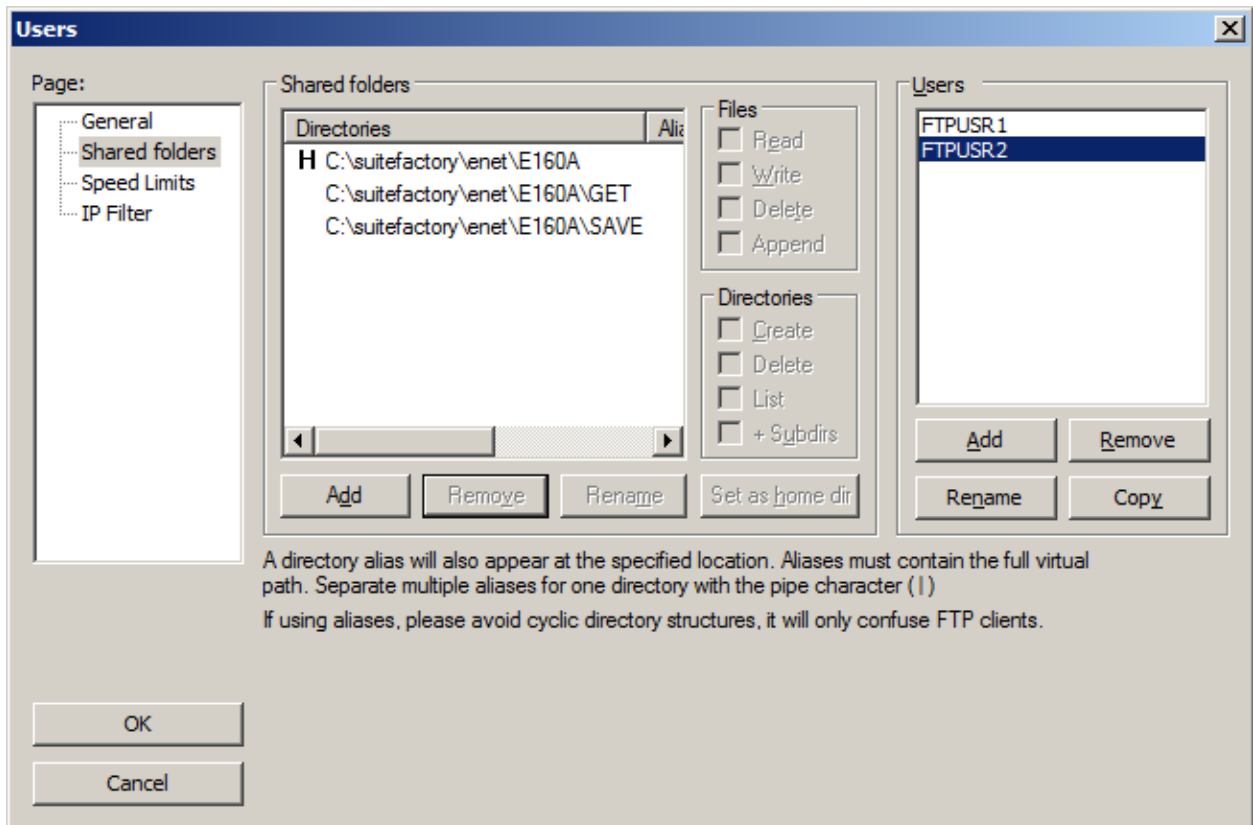
Repeat for as many machine types you have and then you can exit from this application.

Please note that if you have machines that use the same DNC files and are assigned to the same Resource Collection they all can share the same FTP shared folders.

End of Document