



Overview - Upgrading/Replacing Computers (PCs)

Matrix is a Graco PC based Fluid Management System that runs on one or more of your facilities PC's. This guides you through moving Matrix from old PCs to new ones. This is intended for IT staff, and assistance from Graco is not required unless you need new software.

Please read through each section until you get to “Starting your Upgrade” (pg. 4) and complete all steps in preparation for the upgrade.

Considerations

1. The upgrade requires time where Matrix is not operational. What are the downtime options?
 - 1.1. Use bottled fluids.
 - 1.2. Put meters and pump air controls into “Emergency / Override modes.”
 - 1.3. Have technicians wait until the upgrade is complete.
2. How much downtime you can afford vs. doing it outside of normal business hours? See estimated times below.
3. If you run into issues, you may need assistance from Graco.

NOTE: Graco Technical Assistance is only available Monday through Friday (7:30 AM - 5:00 PM Central Time).

Prerequisites

1. Compile a list of all PCs that have Matrix installed and determine which PCs to upgrade.
2. Back up the current Matrix database before removing the PCs from service.
3. Identify what version of Matrix you have.
4. Obtain the software from Graco, if needed.
5. Have the Matrix software on CD, a portable USB drive, or network drive for easy access.
6. Run all Windows Updates on the new PC(s) before starting.

Definitions

- Matrix “Server” - This is the main Matrix PC that houses the Matrix database. This may be the only PC.
- Matrix “Client” - These are other PC's that have Matrix installed that can access the server.
- Matrix 3 Client - The Desktop icon used to open or view Matrix on any Matrix PC.
- DMS – Your Dealer Management System (CDK, Reynolds & Reynolds, Dealertrack, Procede, etc.).

Estimated Time Needed

- Matrix server
 - ~15 - 30 minutes
- Matrix clients
 - ~2 minutes if not upgrading PC and you have the correct software already installed on them.
 - ~5 minutes if upgrading the PC also.
 - ~10 minutes if not upgrading PC also.

NOTE: When upgrading, start with the server and proceed to the clients (if used). If clients are used, upgrade the ones that have transceivers plugged into them immediately following the server upgrade.

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Action Items

During the course of the upgrade, there will be colored text entries and links. These indicate the need to reference other areas of the document, pause to perform another task before proceeding, or stop to get assistance.

- [Links](#) – These are temporary tasks; return to the step you were on once completed.
- **Green Text** – These are navigational commands directing you to skip to or reference (ref.) another section.
- **Red Text** – These are **STOP** points where you will need assistance from Graco or your Graco distributor.

NOTE: It is best to view this guide electronically to preserve the links and Action Item's references, if printing, print in color. Navigation tip – If you click an internal link to reference something, press "Alt" + "Left Arrow" to return to your last location.

FAQ's

- Q – What if Matrix is integrated with my DMS (where it automatically bills dispense charges to work orders)?
A – Keep reading before you start the upgrade.
- Q – What if I have multiple Matrix servers running for different shops in my facility?
A – Complete this upgrade for each system normally. When complete, contact Graco for further assistance.
- Q – Do I need the most current version of Matrix to run it on Windows 10?
A – No, but it must be 3.2 Build 1 or newer. Contact Graco to get a new copy and to get your database converted.
- Q – Does this have to be installed on Windows 10?
A – No, Matrix can be installed on most operating systems; Windows 10 is the most common.
- Q – Is there any reason to upgrade to the latest version of Matrix?
A – No, not unless your current / past system has a software bug that a newer version may fix.
- Q – I have multiple facilities running Matrix, how can I get them all on the same version?
A – Contact Graco for further assistance.
- Q – Does this cover a Matrix 2 system?
A – No, Matrix 2 systems only run on Windows XP and will not run on newer operating systems.

Basic Steps

NOTE: These basic steps outline how to perform an upgrade on a simple installation. Installations that are more complicated may require more steps found in the following pages. Follow through until you are done.

1. Finding your Matrix software version
2. Obtain new software (if needed)
3. Starting your upgrade
4. Inform users about downtime
5. Export database
6. Server PC preparation
7. Import database
8. Configure the transceiver(s)
9. Client PC's (if used)
10. Apply Windows Settings
11. Verify system operation
12. Troubleshooting (if needed)

Contacting Your Graco Distributor

There are references for you to contact your Graco distributor in this guide; you may also choose to contact them for assistance. If you do not know who your Graco distributor is, use our [Find a Distributor](#) utility to find one:

- Under **Product Category**, choose **Bulk Fluid Management Systems**.
- Under the **Product Family**, choose **Pulse Pro – Fluid Management** (Matrix successor).

Contacting Graco Tech Assistance

Find our contact information at the bottom of each page should you need assistance, or are directed to contact us by this guide. You can also use our online [Support Portal](#) to get in touch with us.

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Identify and Obtain Software - Upgrading/Replacing Computers

Identifying Matrix Software

Matrix software is identified by a Version and a Level (3.x Build x / Basic, Pro, Premier or Premier with a DMS Integration). Identify the software version / level you have and get software from Graco (if needed) to make the upgrade go smoothly.

NOTE: If you already have a copy of the Matrix software, DO NOT assume it is the same as what was running, confirm below.

1. If Matrix is not running, reference [Restarting Matrix Services](#), [Troubleshooting](#) or [contact Graco](#). Continue after Matrix is running. If you cannot get it running, [skip](#) to step 3.
2. If Matrix is running:
 - 2.1. At the server, open Matrix, in the upper left corner of the screen, click **Go To>About Matrix**.
 - 2.2. Observe and note the Matrix client Version / Build and the Level (the line below Version / Build).
 - 2.3. If Matrix automatically bills dispense charges to your DMS, choose from below: (if not, [skip](#) to step 2.4)
 - 2.3.1. CDK Global – **STOP** and [go here](#) to start the upgrade instead of using this guide. You may still reference the Troubleshooting and How To sections in this guide if needed.
 - 2.3.2. Reynolds & Reynolds – **STOP** and [contact Graco](#).
 - 2.3.3. Dealertrack – **STOP** and [contact Graco](#).
 - 2.3.4. Procede – Continue reading.
 - 2.4. If you have 3.1 Build 9 or older (example - 3.1 Build 2), [contact Graco](#). You will need new software and Graco will need to update your database. Once Graco returns your database, [skip](#) to [Starting Your Upgrade](#).
 - 2.5. If you have 3.2 Build 1 or newer and you have the same software, [skip](#) to [Starting Your Upgrade](#).
 - 2.6. If you have 3.2 Build 1 or newer and you do not have the same software, [skip](#) to [Obtaining Software from Graco](#).
3. If the server is not running or available, [ref. Identifying Matrix Software / Finding Database](#) for more advanced options on finding the version AND a database.
 - 3.1. If you find the version, but no database can be found, **STOP** and [contact your Graco distributor](#). The system will need to be re-built.
 - 3.2. If you found both the version and a database, continue.

NOTE: Once you have identified the complete Version / Build and Level (including DMS if used), now compare it to the software you have (if you have it).

Obtaining Software from Graco

If you determine that you need a new copy of the software, [contact Graco](#) and they will get you a direct download link.

NOTE: Delete or destroy any older versions of Matrix software you have to prevent future confusion.

It is unlikely you will need to read this entire document as it will guide you through only the parts you need and direct you to each next step as you go. You may need to reference other parts of the document for more details during the course of the upgrade, remember to note where you left off so you can return to it once each task is completed.

Proceed to the next page for guided instructions on upgrading your PC(s) when you are ready to get started.



Getting Started - Upgrading/Replacing Computers

Starting Your Upgrade

If you have read the previous sections, have the PC(s), software and database ready, start your upgrade now.

Informing Users about Downtime

If upgrading after business hours, skip to [Export Database](#). If upgrading during business hours, see downtime choices below.

1. Refrain from using the system until the upgrade is finished; if this is the choice, skip to [Export Database](#).
2. Use bottled fluids (if available); if this is the choice, skip to [Export Database](#).
3. Put the system into a temporary override mode:
 - 3.1. Matrix meters have an “Emergency Mode” option (you may choose to do all meters or only a select few).
 - 3.1.1. At each meter, press and hold the center button and right arrow buttons together to reach the main menu.
 - 3.1.2. Press the down arrow button to get to **Emergency**, press the center button to select it.
 - 3.1.3. Enter the emergency code number and press the center button (the default is “4357”, but may be different if changed during the setup of the system). Do not provide this number to technicians.
 - 3.2. For any PACs installed, they must be put in “Override Mode.”
 - 3.2.1. At each PAC, press the **Mode** button for 3-5 seconds until it enters override mode.

Export Database

Before shutting down the server, export the database from the old server for importing into the new server. To export:

1. You need an admin level Matrix user account, [contact Graco](#) for a temporary username / password if needed.
2. On the old server, click **Start>All Programs>Graco>Matrix 3>Utilities>Edit Matrix Settings**.
3. In the pop-up window, click **File>Database Utilities>Export Database** and enter your credentials.
4. Take note of, or change the location where you want to export the database and then click **Export Database**.
5. This may take a few minutes. If you see “Export Successful”, skip to [New Matrix Server PC Preparation](#).
6. If you get “Export Failed:”
 - 6.1. Make sure you are at the server. If you are at a client, find the server and start again. For help finding the server, [ref. Identifying Matrix PC Roles](#).
 - 6.2. Once at the server, try restarting the Matrix Services, [ref. Restarting Matrix Services](#).
 - 6.3. If it still does not export after restarting services, try to extract the “Data” folder from the hard drive:
 - 6.3.1. The data folder contains everything you need, copy this entire folder to another location, see path below:
 - 6.3.1.1. For 64 bit PC’s – C:\Program Files (x86)\Graco\Matrix 3\Database\data.
 - 6.3.1.2. For 32 bit PC’s – C:\Program Files\Graco\Matrix 3\Database\data.

New Matrix Server PC Preparation

NOTE: Best practice is to pre-install Matrix and have all Windows updates applied to avoid further delays. If you have not run the Windows Updates, run them or do NOT connect the PC to the internet until the upgrade is complete.

1. Place the new server PC and boot it up.
2. Install Matrix, if not pre-installed.
3. Choose ALL DEFAULTS and reboot when prompted.
4. Log back in, click **Start** and type “About.” Windows finds it (**About your PC**), click and open it.
5. Mid screen, you will see **Device Specifications** and below it **Device Name**. Note the device name.

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Import Database

If you exported or got a copy of your database from the steps above, there are two options:

1. If you copied the entire data folder, [skip](#) to #2. If you exported the database, continue.
 - 1.1. On the new server, click **Start>All Programs>Graco>Matrix 3>Utilities>Edit Matrix Settings**.
 - 1.2. In the pop-up window, click **File>Database Utilities>Export Database**.
 - 1.3. You will be prompted for a username and password, enter the following: (both lower case)
 - 1.3.1. username = "matrix"
 - 1.3.2. password = "graco"
 - 1.4. If "Import Successful" appears, open Matrix, everything is restored. [Skip](#) to [Configure the Transceiver\(s\)](#).
 - 1.5. If your import fails, and you get an "Incompatible database version" message, there is a mismatch (the database version is different than the software version you are trying to install), to check:
 - 1.5.1. Open the exported database in Microsoft WordPad (Notepad may work unless the file is too big).
 - 1.5.2. Press **Ctrl+F** on your keyboard to open a text search.
 - 1.5.3. Type each of the following (one at a time, followed by **Enter**) until found:
NOTE: there are 2 dots in each entry, be sure to add the end dot.
 - 1.5.3.1. (3.0. or 3.1. or 3.2. or 3.3. or 3.4. or 3.5. or 3.7.).
 - 1.5.4. Once you find the database version, check which version of software you installed.
 - 1.5.4.1. If the database is 3.2.x or newer (but not 3.5.1), [contact Graco](#) to get that version and reinstall it.
 - 1.5.4.2. If the database is 3.5.1 specifically, and you are installing 3.7.1:
 - 1.5.4.2.1. Go back to, or re-open the exported database in WordPad or Notepad.
 - 1.5.4.2.2. Find the 3.5.1 again and change the 5 to a 7.
 - 1.5.4.2.3. Save the file (this may take time).
 - 1.5.4.2.4. Try importing again. If it imports successfully, [skip](#) to [Configure the Transceiver\(s\)](#).
2. If you got it by copying the entire data folder, it takes a few more steps since you cannot import the data folder as it is:
 - 2.1. Stop all 3 Matrix Services, [ref. Restarting Matrix Services](#), server steps 1-5 only.
 - 2.2. Click **Start** and type "File Explorer", Windows finds it, click and open it.
 - 2.3. Navigate to **This PC>C:\Program Files (x86)\Graco\Matrix 3\Database**.
 - 2.4. Delete the entire data folder.
 - 2.5. Find and paste the recovered data folder.
 - 2.6. Start the Matrix Transceiver Service, [ref. Restarting Matrix Services](#), server steps 6-8.
 - 2.7. Start Matrix. You should now see all of your meters, if not, [contact Graco](#).



Configure the Transceiver(s)

Transceivers can be plugged into any Matrix PC. PC's do not see transceivers, but they do see the software drivers, to verify:

1. Plug in the transceiver(s) that were plugged in originally.
 - 1.1. Click **Start** and type "Device Manager." Windows finds it, click and open it.
 - 1.2. Navigate down the list to **Ports (COM & LPT)** and expand it by clicking the >.
 - 1.3. Look for a **Silicon Labs CP210x USB to UART Bridge (COMx)** for each transceiver plugged into the PC.
 - 1.4. If all show up, **skip** to step 2, if one or more do not show up, continue.
 - 1.4.1. Unplug the USB cable and plug back in, Device Manager is "Live", you will see activity, if not:
 - 1.4.1.1. It may be a bad USB cable or bad port on the PC, use process of elimination to determine which.
 - 1.4.1.2. It could also be a bad RS 422 converter if used, (RS 422 converters are used in most applications).
 - 1.4.1.2.1. Process of elimination can be used here if you have other RS 422 converters.
 - 1.4.2. If you still have trouble finding them, or they show up under a different type of device, [contact Graco](#).
2. When all of the transceivers are visible, check the driver version for each one.
 - 2.1. In Device Manager, right click one of the transceivers and choose **Properties**.
 - 2.2. Click the **Driver** tab and note the **Driver Version**.
 - 2.2.1. If the PC is Windows 10, the driver must be 10.1.3 or newer.
 - 2.2.2. If the PC is Windows 7 – no need to upgrade.
 - 2.2.3. If you have more than one, leave Device Manager open. Close after all drivers are verified.
 - 2.3. If all drivers are good, **skip** to step 3.
 - 2.4. If needed, download the driver using [this link](#) or Copy & Paste the text below into a web browser.
https://www.silabs.com/documents/public/software/CP210x_Universal_Windows_Driver.zip
 - 2.5. Navigate to the **Downloads** folder on your PC.
 - 2.6. Find and "Unzip" the downloaded file.
 - 2.6.1. Right click the file and choose **Extract all**.
 - 2.7. Go back to **Device Manager>Silicon Labs>Driver** dialog box and click on **Update Driver**.
 - 2.8. In the next window, click on the **Browse my computer for driver software** option.
 - 2.9. Click the **Browse** button and navigate to the unzipped driver folder from earlier.
 - 2.10. Click **Next**. This should update the driver.
 - 2.11. When prompted to reboot the PC, do so after all are completed., then reboot.
3. Open **Device Manager>Ports** again, right click a **Silicon Labs** entry and choose the **Power Management** tab.
 - 3.1. Uncheck any boxes, repeat for all Silicon Labs entries.
4. Verify that Matrix also sees the transceivers.
 - 4.1. Open Matrix if it is not.
 - 4.2. Click **Start** and type "Services," Windows finds it, click and open it.
 - 4.3. Scroll down to the **Matrix Transceiver Service** and restart it
 - 4.4. In Matrix, look for **Transceiver Connected** in the event viewer at the bottom of the page, one message for each.

NOTES:

1. Transceiver Connected messages may not show up if plugged into clients. Restart the transceiver service on each client that has them to see the Transceiver Connected message.
2. Device Manager sees devices connected to the PC in the form of drivers, only Matrix can see actual transceiver(s).

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Matrix Client PC's

Matrix can be installed on more than one PC at a facility; additional PC's are called clients. If there are no clients, skip to [Apply Windows Settings](#). If you have clients, you will need to address each of them, whether you are upgrading those PC's or not.

Installing Matrix on a Client

These steps apply if you are upgrading / adding PC's or reinstalling Matrix on existing clients because of a version change.

1. Run the Matrix installer and several clicks in, you will be notified of a choice between "Typical and Custom."
2. Click **Next** to get to the dialog box where you have to make the actual choice, choose **Custom**, then **Next**.
3. You will see three check boxes, client will be the only one checked, don't change it, and choose ALL defaults after that.
4. You are prompted for the name or IP address of the **Matrix database server**.
5. Type the name or IP address of the server PC and click **Next**. Ref. [New Matrix Server PC Preparation](#), step 4 & 5.
6. You are prompted for the name or IP address of the **Matrix server**.
7. Type the name or IP address of the Matrix server PC and click **Next**. Use the same name from step 5, above.
8. Repeat for all clients.

NOTES:

1. If IP addresses are used in steps 5 & 7 above, the server MUST have a static IP address.
2. All Matrix PC's must be running the same version of Matrix software, upgrade if needed.
3. All clients must point to the server. Ref. [Matrix Properties File Editor](#), items 4 & 5.
4. For each client that has a transceiver, go through [Configure the Transceivers](#) and [Apply Windows Settings](#).

Primary Clients

If a user at a client needs access to the **Setup & Reports** features in Matrix, then configure it as a **Primary Client** at the server. If you imported a database, there may be existing Primary Clients set up in it. If you are adding or upgrading clients, you may need to add these clients due to a PC name change. If not, skip to [Apply Windows Settings](#).

At the Clients.

1. At the client, find the PC's name (IP addresses cannot be used).
 - 1.1. Click **Start** and type "About." Windows finds it (**About your PC**), click and open it.
 - 1.2. Mid screen, you will see **Device Specifications** and below it **Device Name**, note the name.
2. Repeat this for every client that needs this capability.

At the Server

1. Open Matrix, in the upper left corner of the screen, click **Go To>Setup & Reports** and log in.
2. Navigate to the **Primary Clients** section on the left side of the screen.
3. Click **Add New**.
4. Type the PC name of the client that needs this access.
5. Repeat this for each client.
6. Make sure that the user(s) of these Primary Clients have admin level user accounts:
 - 6.1. At the server, click **Users** at the left side of the screen.
 - 6.2. Edit or add the user and set them up as an **Administrator** using the buttons at the bottom of the screen.



Apply Windows Settings

Graco recommends changing some PC Firewall and Power settings to ensure trouble-free communication with Matrix. Check these settings and make sure a Group Policy does not manage them.

Configuring Windows Defender Firewall

1. If there are no clients, [skip](#) to [Configuring Power & Sleep Settings](#).
2. Click **Start** and type “Windows Defender Firewall.” Windows finds it, click and open it.
3. If you see all red vertical ribbons AND a note saying, **For your security, some settings are managed by your system administrator**, you can ignore this, it is disabled, [skip](#) to [Configuring Power & Sleep Settings](#).
4. On the left side of the screen, click **Advanced Settings**.
5. In the new window, click **Inbound Rules**.
6. Click the **Action Menu**, then **New Rule**.
7. In the dialog box, click the **radio button** next to **Port**, then click **Next**.
8. In the **Specific local ports** text box, type “20000-20006”, and then click **Next**.
9. Make sure **Allow the connection** is checked, if not, check it, then click **Next**.
10. In the next dialog box, all three of the boxes should be checked, fix if needed, and then click **Next**.
11. In the **Name** text box, type “For Matrix” and click **Finish**.
12. Click **Outbound Rules**.
13. Repeat steps 5-11 in **Outbound Rules**.

Configuring Power & Sleep Settings

NOTE: If the PC is set to a **High Performance** profile, it may be ok, but Graco still recommends applying the settings below for trouble-free performance. [Skip](#) to [Verify System Operation](#) if desired.

1. Click **Start** and type “Power & Sleep Settings”, Windows finds it, click and open it.
2. On the right side of the screen, find **Related Settings** and click **Additional power settings** shown below it.
3. In the next window, click **Create a power plan**.
4. In the next window, click **High performance** and in the **Plan name** text box, type “For Matrix”, click **Next**.
5. In the next window, click **Create**.
6. In the next window, find your new power plan and click **Change plan settings** to the right of it.
7. In the next window, click **Change advanced power settings**.
8. In the next window, find, expand and change:
 - 8.1. **Turn off hard disk after** setting and scroll it down to **Never**.
 - 8.2. **Sleep>Sleep after** and scroll it down to **Never**.
 - 8.3. **Sleep>Allow hybrid sleep** and scroll it down to **Off**.
 - 8.4. **Sleep>Hibernate after** and scroll it down to **Never**.
 - 8.5. **USB Settings>USB selective suspend** setting and change it to **Disabled**.
 - 8.6. Click **Apply>OK**.

NOTE: If the computer is a laptop, there will be two modes for each of the above settings, apply all of the **Plugged in** options as stated above. You can mirror them on the **On battery** mode or change as desired. Just be aware that this may affect Matrix if on battery power.



Verify System Operation

Once you are done with the upgrade, Graco recommends that you verify that all devices still communicate with the software, follow steps below: You may choose to just try using the system, if so [skip to Final Notes](#).

1. Open Matrix, in the upper left corner of the screen, click **Go To>Setup & Reports** and log in.
2. Navigate to the **TLM** section on the left side of the screen.
 - 2.1. If you have TLMs, highlight and click **Modify** to open their dialog box.
 - 2.2. Click **OK** at the bottom of the dialog box and its “Profile” should then turn green.
 - 2.3. Repeat for all TLM’s.
3. Navigate to **Meters** section on the left side of the screen.
 - 3.1. Modify and click **OK** for each of them as you did for the TLM’s until all of them are also green.
 - 3.2. Go around the shop and wake up every TLM and meter by pushing any button (TLM’s only have one).
4. If you have PACs, and put them into “Override” mode earlier, put them back in Matrix mode.
 - 4.1. At a PAC, press the **Mode** button for 3-5 seconds until it enters **Matrix** mode, repeat for each PAC.
NOTE: PACs do not turn green / white like meters and TLM’s.
5. Go back to the server and observe meter & TLM screens. If any are still green, there are several possibilities:
 - 5.1. They were missed.
 - 5.2. The batteries are dead.
 - 5.3. They are not communicating for some other reason. [Ref. Troubleshooting](#).
 - 5.4. Try navigating to another Matrix screen and back to force a screen refresh, retry this as needed.
 - 5.5. For any leftover green meter profiles, the next thing to do is try registering them.
 - 5.5.1. Go find and wake one of the specific meters.
 - 5.5.2. Press and hold the center button and the right arrow button to get to the main menu.
 - 5.5.3. Press the center button to get to the Register menu.
 - 5.5.4. Press the right arrow button to navigate to **Register** at the bottom of the screen.
 - 5.5.5. Press the center button to register the meter, it should reboot.
 - 5.5.5.1. If not, try registering it a second time.
 - 5.5.6. Repeat as needed until all meters are white at the software.
 - 5.6. For green TLM profiles:
 - 5.6.1. Press the TLM button and observe the screen for 15 seconds AFTER it goes blank.
 - 5.6.1.1. If it shows nothing else, go back to Matrix and check to see if it went back to white.
 - 5.6.1.2. If it shows **No Signal**, there is a communication issue, [ref. Troubleshooting](#).

Final Notes:

1. If any meters were put into Emergency Mode, register those meters to get them to Matrix Mode, [ref. steps 5.5](#) above.
2. PAC’s should ALWAYS be registered, [ref. Register a PAC](#).
3. If your old system printed a piece of paper after each dispense, [ref. Per Dispense Reporting](#).
4. If your old system pushed database backups to another location, [ref. Database Backups](#).
5. If you are still having trouble at this point, [ref. Troubleshooting](#), if that does not help, [contact Graco](#).
6. You should be done with your upgrade.

NOTE: The following pages contain Troubleshooting and general information and How To topics referenced from the guide.

Contact Graco LED Tech Assistance at 800-533-9655, option 2, then 1 or LEDtech@graco.com



Troubleshooting - Upgrading/Replacing Computers

Symptom	Possible Causes	Solutions
Cannot install Matrix software.	Need administrative privileges.	Right click installer and choose Run as Administrator .
		Elevate user privileges on PC.
	C:\Program Files\Graco folder locked down.	Open Graco folder permissions.
	Software installer corrupt.	Contact Graco for new software.
Matrix SERVER PC Message - “Cannot Send Message to MSE.”	Matrix started too early after reboot.	Ref. Restart Services and try again.
	One or more Services not running.	
	Automatic Per Dispense Report feature was enabled on old PC.	Disable feature, ref. Restart Services and try again. If Matrix opens, ref. Adding Credentials for Matrix Features , enable feature, restart services and try again.
	Server name has an underscore (_) in it.	Rename the PC and reboot it or set it up with a Static IP address, ref. Matrix Properties File Editor . You must now use IP addresses in fields for all clients.
Matrix CLIENT PC Message - “Cannot Send Message to MSE.”	Windows Firewall on Matrix server enabled.	Turn off and recheck. If Matrix opens, add exceptions, re-enable Firewall & recheck.
	Network cable unplugged.	Check or repair.
	Matrix server not running.	Power up server.
	Client pointed to incorrect server name or IP address.	Ref. Matrix Properties File Editor .
“No PC Signal” at meters.	Path of communication broken by exchanging PC's.	Register affected meters, try registering a second time.
	Transceiver cannot connect to database.	Ref. Restart Services (transceiver service only) on any PC that has a transceiver that affected meters are communicating through. Look for Transceiver Connected in the Matrix software bottom Event view to confirm.
	Affected meters communicating through a transceiver plugged into a client.	
	USB cable disconnected between transceiver and PC.	Check or repair. Ref. Configuring Transceivers .
	RS-422 Wiring not connected between converter and transceiver.	Check or repair. Ref. Configuring Transceivers .
	RF interference or signal loss.	If none of the above help, explore for other potentially offensive RF or electrical sources.
“No RF Signal” at meters (No Signal on older meters).	Transceiver unplugged from power.	Plug in or verify.
	Meter Network ID or Transceiver ID set incorrectly.	Check meter ID and make sure it matches the PC ID settings Correct whichever is wrong. Compare nearby meters to find out which most likely changed.
	Software Network ID or Transceiver ID set incorrectly.	



Troubleshooting - Upgrading/Replacing Computers

Symptom	Possible Causes	Solutions
Silicon Labs driver not found in Device Manager>Ports.	Transceiver(s) not plugged in.	Plug in or unplug / plug back in.
	Bad USB cable.	Test or swap with another.
	Bad USB port on PC.	Test with another working USB port.
	Bad RS 422 converter (if used).	Test or swap with another.
No "Transceiver Connected" in Matrix.	Service not started.	Ref. Restart Services (transceiver service only).
	Not on correct PC.	Ref. Restart Services (transceiver service only) on PC that has transceiver plugged into it.
Transceiver Service will not run.	PC name changed.	Check or repair.
MSE Service will not run.	Network credentials incorrect.	Check or repair.
Not making backups to remote location.	No network access credentials added to the Matrix MSE service on the new PC.	Add network user credentials to MSE Service, Ref. Restart Services and confirm backup occurs the following day (3AM).
	New PC did not have Matrix Properties File Editor set for remote backups like old PC.	Ref. Matrix Properties File Editor .
Can't get meter into Emergency Mode	Entering a user's PIN number	Enter the Emergency Mode number.
	Accidentally typing the wrong number	Try again.
	Factory Default number was changed	Find out what it was changed to.
	All attempts fail	Ref. To Hard Reset a Meter .
No Signal at tank level monitor	Path of communication broken by exchanging PC's.	Register affected TLMs.
	Transceiver cannot connect to database.	Ref. Restart Services (transceiver service only) on any PC that has a transceiver that affected TLMs are communicating through. Look for Transceiver Connected in the Matrix software bottom Event view to confirm.
	Affected TLMs communicating through a transceiver plugged into a client.	
	USB cable disconnected between transceiver and PC.	Check or repair. Ref. Configuring Transceivers .
	RS-422 Wiring not connected between converter and transceiver.	Check or repair. Ref. Configuring Transceivers .
	RF interference or signal loss.	If none of the above help, explore for other potentially offensive RF or electrical sources.
PAC numbers flashing or alternately flashing E3	Loss of connection during upgrade or other	Ref. Register PAC .
		Ref. To put a PAC into Override Mode , then back to Matrix Mode.
		Power cycle the PAC.
Not printing dispense reports	Printer not installed on PC	Install printer to PC. Ref. Restart Services .
	No network access credentials added to the Matrix MSE service on the new PC.	Ref. Adding Credentials for Matrix Features .



Information and How To Topics - Upgrading/Replacing Computers

Identifying Matrix Software / Finding Database

Matrix software has a Version and Level structure (3.x Build x / Basic, Professional, Premier or Premier with a DMS Integration). Since there are multiple versions and levels of Matrix, it is important to know the version and level running before the upgrade. It is also important to have a database backup from the previous installation.

Finding the Matrix software version and database:

There are multiple sources where you may find both:

1. If your Matrix system is operating:
 - 1.1. Go to any Matrix PC, open Matrix, in the upper left corner of the screen, click **Go To>About Matrix**.
 - 1.2. Note the Matrix Client Version / Build and the Level (shown below the Version).
 - 1.3. If Matrix automatically bills dispense charges to your DMS:
 - 1.3.1. Open Matrix, in the upper left corner of the screen, click **Go To>Setup & Reports**, then log in.
 - 1.3.2. Navigate to the **Interface** section on the left side of the screen.
 - 1.3.2.1. Click **Modify Interface** and note what DMS it is you may need to click the drop down menu.
2. If the server is not operating:
 - 2.1. Ref. [Troubleshooting](#) to try to get it operating, then [go to step 1.1](#).
 - 2.2. If you still cannot get it running [contact Graco](#) for assistance on getting it operational, then [go to step 1.1](#).
3. If Matrix will not open, but the PC runs, look in the default backup folder – **C:\MatrixDbBackups** for SQL files.
 - 3.1. To find the version from an SQL file: (this will also be a database backup you can use)
 - 3.1.1. Open the newest SQL file in Microsoft Wordpad (depending upon size, Notepad may work).
 - 3.1.2. Press “**Ctrl**” + “**F**” simultaneously on your keyboard to open text search.
 - 3.1.3. Type each of the following (one at a time, followed by **Enter**) until found:
NOTE: there are 2 dots in each entry, be sure to add the end dot.
 - 3.1.3.1. (3.0. or 3.1. or 3.2. or 3.3. or 3.4. or 3.5. or 3.7.).
 - 3.1.4. If you find 3.5.1 in the SQL file, use 3.7.1, [ref. Import Database](#), section 1.4.4.2. you will need to modify it.
4. Look to see if an alternate backup location was setup. If one is found, [ref. step 3.1.1](#) for identification.
5. Try contacting the Graco Distributor that installed the system, they may have kept a backup.
6. If you cannot get the server operational and the hard drive is dead, but you have one or more clients:
 - 6.1. Go to one of the clients and try opening Matrix. Watch the upper left hand corner of the splash screen that pops up, after a few seconds it displays the version before it displays **Cannot send message to MSE**.
 - 6.2. Note the version / build. Finding the level is more difficult, we can identify Premier by a couple methods.
 - 6.2.1. If your system has 3 or more transceivers, it is Premier.
 - 6.2.2. If you could filter reports, it is Premier.
7. If you cannot find any of the above, [contact Graco](#) to see if they have one from previous tech assistance calls.
8. If no database is found, **stop** and [contact your Graco Distributor](#). The system will have to be rebuilt.



Identifying Matrix PC Roles

Matrix can be installed on multiple PCs. To figure out which is the server and which are clients, see methods below.

1. If there is only one PC with Matrix – this is the server, and there are no clients.
2. Computer Services.
 - 2.1. Find a Matrix PC that runs.
 - 8.1. Click **Start** and type “Services”, Windows finds it, click and open it.
 - 2.2. Scroll down until you find Matrix.
 - 2.2.1. If there is only one (1) service (Matrix Transceiver Service), this is a client.
 - 2.2.2. If there are any two (2) services, the client could be installed incorrectly, or has a problem.
 - 2.2.3. If there are three (3) services, then this is the server, confirm with step 3.
3. Edit Matrix Settings can also be used to determine it. (Ref. [Matrix Properties File Editor](#) for more information).

NOTE: In method 3 (using the referenced section), if items 4,5 & 6 are all the same, this confirms it is the server. If you still have trouble figuring it out, [contact Graco](#).

Matrix Software

This is the heart of the Matrix system. A database houses all data, configuration and settings. It is identified by its version and build (example – **3.4 Build 1** or **3.4.1**); it also has the following levels, each with different features. (The software and Matrix component links take you to the product instruction manuals).

- | | |
|-----------------------------------|--|
| 1. Basic | 4.1. CDK |
| 2. Professional | 4.2. Reynolds & Reynolds |
| 3. Premier | 4.3. Dealertrack |
| 4. Premier with a DMS Integration | 4.4. Procede |

To find the version and level or a database backup, ref. [Identifying Matrix Software / Finding Database](#).

Transceivers

[Matrix Transceivers](#) are the communication hubs for all other Matrix devices. They plug into any Matrix PC and communicate wirelessly with the Matrix devices. Graco recommends plugging them into the server. Transceivers connect to PCs via:

1. USB cable (16.4 ft., 5 meters maximum length).
2. RS 422 Serial to USB converter (4000 ft., 1219.2 m maximum length).

NOTE: RS 422 converters are found in the Matrix Transceiver manual. They use the same USB cable as a transceiver, but also need a cable assembly consisting of two (2) twisted pairs of conductors with a foil shield and drain (ground wire). Graco recommends [Belden 1419A](#) as the preferred cabling, and does not recommend CAT5 or CAT6 cable.

Finding Transceivers

Transceivers are placed in strategic / central locations to provide the best signal to the other devices. When upgrading PCs, it is necessary to know where the transceivers are, there are several ways to locate them.



PC / Software

1. Open Matrix.
2. In the upper left corner of the screen, click **Go To>Setup & Reports**, then log in.
3. Navigate to the **Primary Clients** on the left side of the screen.
4. Find the **Matrix Console** entry and note the **Host Name** value; this is the server IP address.
5. Navigate to the **Transceivers** on the left side of the screen.
6. Review the list of transceivers listed under the “Installed Client” column.
 - 6.1. If an IP address matches the Matrix Console IP, then it is plugged into the server.
 - 6.2. If there are different IP addresses listed, those transceivers are plugged into client PCs.

Physically

1. USB wiring or USB to RS 422 converters plugged into any Matrix PC will lead to a transceiver.
2. Walk the facility to visually find them, [ref. this Manual](#) for diagram.

NOTE: For transceivers to show up in Matrix, the software driver must first be recognized by the PC they are plugged into.

Meters

[Matrix Meters](#) are the dispensing end of the system, and communicate wirelessly through the transceivers to Matrix.

Registering Meters

1. For a new Matrix system, register a meter to make it available for configuration in Matrix.
2. To bring a meter that is in Emergency Mode back into Matrix Mode.
3. To re-establish communication with Matrix after a disruption.

To Register a Meter:

1. Press and hold the center button and right arrow button simultaneously for two (2) seconds to get to the Main menu.
2. Press the center button again to get to the Register menu.
3. Press the right arrow button until Register is highlighted at the bottom of the screen.
4. Press the center button again to Register the meter.
5. If a “No PC Signal” message appears, try registering it again. If that still fails, [ref. Troubleshooting](#).
6. If a “No Signal” or “No RF Signal” message appears, [ref. Troubleshooting](#).

Changing a Meter’s Network or Transceiver ID

Change a Network & Transceiver ID, if needed while in the Register screen.

[Ref. To Register a Meter](#) to get to the Register menu, use the Right/Left arrow buttons to navigate, the Up/Down arrow buttons to change values, and the center button to select or lock in each value.

To put a Meter into Emergency Mode

Allows Matrix meters usage if they lose communication with Matrix for any reason. Follow the steps below:

1. Press and hold the center button and right arrow button simultaneously for two (2) seconds to get to the Main menu.
2. Press the right arrow button until you get to the “Emergency” menu and press the center button.
3. Enter the Emergency Mode number (factory default is 4357)
4. Register a meter to bring it out of Emergency Mode.

NOTE: Matrix does not track meter dispenses while in Emergency Mode.

Contact Graco LED Tech Assistance at 800-533-9655, option 2, then 1 or LEDtech@graco.com



To Hard Reset a Meter

This puts a meter into factory default. Do this if the meter does not respond, will not register, or enter Emergency Mode.

1. Turn the meter over and remove the four (4) corner Torx screws from the housing to loosen the bezel.
2. Gently separate the bezel and housing.
3. Find the single button located on the circuit board in the bezel half.
4. Power down the bezel by either removing the battery cover or the battery module power connector.
5. Wait 30 seconds, then press and hold the single button on the circuit board.
6. While still holding the single button, re-apply power to the circuit board by reversing the method used to disconnect it.
7. Release the single button.
8. The meter will need to be set to the proper Network & Transceiver ID's it had before the reset.
 - 8.1. If this is unknown, go to another nearby meter, go to the **Register** screen and note the ID's found, ref. [Changing a Meters Network or Transceiver ID](#).

NOTE: After upgrading, verify Matrix meter communication, ref. [Verify System Operation](#).

Pump Air Controls

[Matrix Pump Air Controls](#) (PACs) allow air to flow to the pump(s) and have two functions:

1. Only allows dispenses under control of the Matrix system.
2. When business is closed, keeps the air supply to the pumps off, preventing accidental spills if a line ruptures.

Registering PACs

1. For a new Matrix system, so it is configurable in Matrix.
2. To re-establish communication with Matrix after a disruption.
3. If you had to delete transceivers.
4. If you performed an upgrade.

To Register a PAC

1. At a PAC, press both the **Network ID & Transceiver ID** buttons until they blink, then let go.
2. Numeric lights should be solid, if they are blinking or flashing **E3**, ref. [Troubleshooting](#).

To put a PAC into Override Mode

This allows Matrix PACs usage if they lose communication with Matrix for any reason. If PACs are used, override them when putting meters into Emergency Mode.

1. At the PAC, press the **Mode** button for several seconds until the **Override** light turns on, then let go.
2. The PAC is now open full time.
3. Reverse the process to bring it back to Matrix Mode.

NOTE: Put the PACs back into Matrix Mode every night before leaving to protect from spills in case of a line rupturing



Tank Level Monitors

[Matrix Tank Level Monitors](#) (TLMs) report tank levels on a scheduled basis or can report on demand with the push of a button. Both methods update Matrix.

Registering TLMs

1. For a new Matrix system, so it is configurable in Matrix.
2. To re-establish communication with Matrix after a disruption.

To Register a TLM

1. At a TLM, press button until **Register Mode** displays, then let go.
2. **Registration Complete** displays when finished

NOTE: After an upgrade, verify Matrix tank level monitor communication, ref. [Verify System Operation](#).

Restarting Matrix Services

Matrix runs as three PC Services in the background and has a user interface - “Matrix 3 Client” (the icon on the Desktop). Restarting these Matrix services can remedy a variety of Matrix issues. Try this before contacting Graco. We will be addressing the services running on the server most of the time. If you have transceivers connected to clients, then you may also need to restart the transceiver service on those specific clients to resolve transceiver issues there.

For the Matrix Server

1. Close Matrix if it is open.
2. Click **Start** and type Services. Windows finds it, click to open.
3. Scroll down to the Matrix Services.
4. Right click **Matrix3MySql** service and choose **Stop**.
5. A dialog box **Stop Other Services** appears. Click **Yes** (this also forces dependent services to stop).
6. Once completed, right click **Matrix Transceiver Server** and choose **Start** (forces dependent services to start).
7. Try opening Matrix again (if system memory is low, or the computer is generally slow, wait an extra 10 seconds after starting services before trying to open Matrix).

For Matrix Clients

This is only needed when Matrix transceivers are plugged into the client(s).

1. Click **Start** and type Services. Windows finds it, click to open.
2. Scroll down to the Matrix Services.
3. Right click **Matrix Transceiver Server** and choose **Stop**.
4. Once completed, right click it again and choose **Start**.
5. Open Matrix and look for “Transceiver Connected” at the bottom of the page in the event viewer section. You should see one entry for each transceiver plugged into that PC.



Matrix Properties File Editor

This is a configuration tool installed on every Matrix PC by default. During installation of the server, the correct configuration is automatically populated. During client PC installations, it is partially populated and prompting for two additional pieces of information occurs (items 4 & 5 below). There is no need to make any changes to this after an installation.

Rules (items listed below are only some of the fields found in the tool)

	FIELD	RULE
1	Backup Program	Only visible when installed as a server, if not the server, re-install as a client.
2	Database file export directory	Only visible when installed as a server, if not the server, re-install as a client.
3	Matrix Client name	The name of the PC you are using. (It is always "Matrix Console" on the server)
4	Matrix Database Server host name	The name (or IP address) of the server on ALL PCs
5	Matrix Server (MSE) host name	The name (or IP address) of the server on ALL PCs
6	Transceiver Server host name	The name of the PC you are using.

If changes are needed (due to PC exchanges or troubleshooting efforts)

1. Click **Start** and type "Edit Matrix Settings." Windows finds it, click to open.
2. The **Matrix Properties File Editor** opens.
3. In the left column, find the **Matrix Database Server host name** field.
4. In the right column opposite it, double click in the cell and type the PC Name or IP address of the server.
5. In the left column, find the **Matrix Server (MSE) host name** field.
6. In the right column opposite it, double click in the cell and type the PC Name or IP address of the server again.
7. Once completed, click once in any cell in the left column to exit edit mode.
8. Click **File>Save** and then close.
9. Before trying to open Matrix again, ref. [Restarting Matrix Services](#).
10. If the server does not open after restarting services,
11. Change items 4, 5 and 6 in the Rules table above to the value **localhost**.
12. Save (items 7 & 8 above)
13. Restart the services again
14. If Matrix opens, it is a networking or PC naming issue.

Once that is resolved, leave the localhost values ONLY if it is a single Matrix PC system, otherwise, change all three values back to the server name or IP address so clients can connect. Localhost turns off all networking.

NOTES:

1. Do not make changes to any other values in this tool, as it may cause Matrix to stop functioning.
2. The server PC name cannot contain an underscore (_), however, a hyphen (-) is ok, rename if needed.
3. When using an IP address on the server, it must be set to a static IP address for clients to connect consistently.



Per Dispense Reporting

This software feature prints a dispense report at the end of each dispense. Due to network security, network printers installed on a PC will NOT show up in Matrix. If a printer was setup on the old server, install it on the new server and configure it for Matrix.

1. Install the desired printer on the PC.
2. Perform the steps to add credentials, ref. [Configuring Transceivers](#).
3. Open Matrix, in the upper left corner of the screen, click **Go To>Setup & Reports** and log in.
4. Click **Modify** at the bottom center of the screen.
5. Click the drop down to the right of the **Dispense Report Printer** to find and select your network printer, click **OK**.
6. Dispense and verify printing of the report.

Database Backups

Matrix makes a database backup at 3 AM daily; this time is not adjustable. The default location for the backup is on the same hard drive as the “Live” database (on the server). The SQL file created contains all user settings and historical data from the date Matrix was installed. Graco recommends having two (2) separate copies of the backup kept in different locations.

To change the location of backups, ref. the [Matrix Properties File Editor](#). There are several options:

1. Leave the default folder intact and replicate it to another location after 3 AM daily (preferred option).
 - 1.1. Use a third-party tool to replicate the default backup folder to another location (Robo-Copy, etc.).
2. Change the location of the backup to a Network drive or share.
 - 2.1. Perform the steps, ref. [Configuring Transceivers](#).
3. Change the location of the backup to a USB drive (not recommended as the drive is easily removed or lost).

Adding Credentials for Matrix Features

Two features of a Matrix system installed on a network require a network user’s credentials to work correctly. They are Automatic Per Dispense Reports and Database Backups if they are set to back up to a network server.

To add Credentials

1. Close Matrix, if it is open.
2. Click **Start** and type Services. Windows finds it, click to open.
3. Scroll down and right click **Matrix Service Engine** and choose **Properties**.
4. Click the **Log On** tab.
5. Click the **This Account** radio button and then click **Browse**.
6. Click **Locations**, select the domain or **Entire Directory** and click **OK**.
7. Enter a valid domain user name in the **Enter object name to select** box and click **Check Names**.
8. Click **OK**, if one populates. Keep trying until you find a valid one.
9. Type in the password again, to confirm, and then click **OK**.
10. Click **OK** for the next two pop-up boxes.
11. Right click **Matrix3MySql**, choose **Stop**, and then click **Yes** at the pop-up dialog box.
12. Right click **Matrix Transceiver Server**, and then choose **Start**.

NOTE: If regular password changes are required, it needs to be changed here each time also. Graco recommends creating an Admin level user account with a password that NEVER expires to avoid this issue.